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# Concentration Plans Would Create Havoc

## Thirteen Mill Communities in Wisconsin Are Almost Entirely Dependent Upon Paper Mills For Employment—Few Mill Towns Offer Any Labor Competition For War Industries—Other Mill News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., November 16, 1942—Wisconsin well illustrates the results of the survey made by the American Paper and Pulp Manufacturers Association through which it is pointed out that industry concentration plans would wreck the means of livelihood in a number of communities.

Thirteen of the mills are located in "mill villages," communities that were built up with the industry when it located there, and have practically nothing else of an industrial nature to furnish employment. These are—Brokaw, Combined Locks, Cornell, Kimberly, Little Rapids, Mosinee, Nekoosa, Niagara, Park Falls, Peshtigo, Port Edwards, Rothschild and Tomahawk. Other cities whose mills are the major source of employment include Ashland, Kaukauna, Ladysmith, Menasha, Merrill, Neenah, Oconto Falls, Rhinelander, Shawano, West De Pere and Wisconsin Rapids.

There would also be serious displacement in Appleton, Green Bay, Marinette and Stevens Point were any of the mills or converting plants to be closed under a horizontal curtailment. No mills are located in cities above 50,000 population except one box board plant in Milwaukee.

### Few Mill Towns Adapted for War Work

None of these cities except Milwaukee offers any labor competition for war industries, nor are they utilizing power needed for war plants. Eau Claire with one paper mill and Beloit, with a box board mill, have extensive war production but the other cities do not. The power supply, because of the extensive water power and the present hydro-electric expansion, is more than ample without curtailment. If mills were shut down, there could be little shift of workers to other local plants to help the war effort. It would mean a migration to other cities where war plants or shipyards are located, and these communities already have problems of congestion and housing shortage that would be seriously aggravated.

### Paper Men on Safety Conference

Roy H. Purdy, general manager of the Tuttle Press Company, will be program chairman for the Fox River Valley and Lake Shore Safety Conference when it is held in Appleton next May, according to announcement of W. E. Schubert, conference chairman, who is vice-president of the Wisconsin Michigan Power Company. Preliminary plans were formulated at a meeting of the executive committee at Appleton November 6.

Among Purdy's assistants will be: John Reeve, Appleton Coated Paper Company; Helm Hussner, Valley Iron Works Company; L. C. Smith, Thilmany Pulp and Paper Company; Joseph Doerfler, Kimberly-Clark Corporation, and representatives of other industries.

H. F. Hackworthy of Combined Locks Paper Company, C. R. Furminger, Appleton Machine Company, and A. R. Ellis, Kimberly-Clark Corporation, will serve on the steering committee.

Sectional meetings are planned for the executives of paper and pulp mills and converting plans. L. C. Smith will have charge of the paper products and finishing section, and Lester Small and Joseph Doerfler of the pulp and paper section.

### State Court Rulings Interest Paper Men

Two of last week's decisions by the Wisconsin Supreme Court were of interest to the paper industry. In one case, the court ruled against an order issued by the Wisconsin Department of Taxation compelling the Fox River Company, Appleton, Wis., to pay an additional tax assessment of $16,200.

The company, of which W. C. Wing was president, entered into a contract September 12, 1938, to sell its assets and inventories to a new firm, the Fox River Paper Corporation, present operators of the mills. The stipulation was $1,750,000 in cash, or $1,250,000 in cash plus 5,000 shares of preferred stock on which the seller fixed a par value of $100 per share.

In the final settlement on November 28, 1938, the selling company received $1,682,740.50 cash and 5,000 shares of preferred stock, which its directors immediately placed on the market for sale. The stock produced only $50 per share.

The tax department claimed that under the law

*(Continued on page 16)*

# Chicago Reports Continued Heavy Buying

## Strong Demand For All Major Grades of Paper Creates Doubt if Wanted Tonnage Can Be Produced and Delivered — Salesmen Hear Traffic Expert—Wallpaper Men Discuss Contract Problems.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., November 16, 1942.—Despite the many perplexities that surround the local paper market, demand continues to be very strong. Newest element of wonderment is how merchandise is to be produced under various curtailment orders and how deliveries are to be made during a period when shortages in transportation becomes acute. During the past week virtually all grades and lines of paper came bobbing up to the ceiling prices as buyers sought paper before the marked effect of curtailment could be felt. Kraft papers were in excellent demand with prices very firm. Groundwood offices were likewise active in checking orders and mill production capabilities. Newsprint was also active while books and covers, perhaps latest to come to the front, were reported as "strong." Sulphites were steady as buyers went to these lines to attempt to overcome critical shortages elsewhere. Specialties were better and the board industry likewise found more interest in the folding box demand. Waste paper collections were up but the general tone of the market helped to inject new strength into these lines as well.

### Col. Browning Discusses Contract Problem

Renegotiation of contracts for war goods as a price control measure takes the place of competition among producers in peace-times, according to Col. A. J. Browning, director of purchases of army supplies, who spoke before the Illinois Manufacturers Association at a meeting held in Chicago this week. Mr. Browning is well known to a division of the paper industry as the former president of the United Wall Paper Factories, Inc., a rapidly growing company which is now almost entirely devoting its interest to the making of war goods.

Mr. Browning declared that the control of costs is just as important in the war program as the control of profits. Excess profits, taxes and profit limitations leave untouched the incentive to control costs and do not prevent inflation, he said. He added that a high excess profits tax does not encourage efficiency and may even tend to discourage it. He stated that the renegotiation procedure is far from ideal but "the best one proposed for the purpose and, properly administered, does provide for current control of prices and for indirectly keeping costs down through pressure on prices."

### Salesmen Hear Traffic Expert

The western division of the Salesmens Association of the Paper Industry held one of its most interesting meetings on Monday, November 10, when J. E. Bryan, traffic expert, discussed the ramifications of the maximum carloading order—number 18—as it applies to the paper industry. Mr. Bryan is general traffic manager of the Wisconsin Paper and Pulp Manufacturers Association and also a member of the transportation committee of the Pulp and Paper section of the War Production Board.

Mr. Bryan pointed out that the Office of Defense Transportation expects some errors as the complexities of the Order appear—but he indicated that even during this trial period when mistakes would be natural, the government was relying upon the paper industry to demonstrate its usual patriotic record of compliance. The traffic expert pointed out that paper is to be loaded to the marked capacity of box cars as designated and supplied by the railroads for definite transportation of paper and pulp products.

Questions were also asked concerning the general ODT program of conservation and relative to the recent 3 per cent transportation tax which affixes a new tax burden on "for hire" carriers. The meeting was one of the most interesting of those yet held at paper salesmen's "headquarters" at the Hotel Sherman in Chicago.

### Southern Kraft Acquires New Sites

The Southern Kraft Paper Corporation, a division of International Paper Company, this week acquired three large properties in the vicinity of Kedzie avenue and 31st street from the Waterway Board and Paper Company. The price paid was $199,000, plus assumption of an incumbrance. It is assumed that these properties will be utilized to take care of the expanding business of this division of International in this territory.

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## Plan for Post-War World

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Nov. 18, 1942—National Resources Planning Board has issued a "Post-War Agenda," which "outlines the problems this country is facing now in the search for practical paths toward realizing the new world for which we fight." The purpose is to provide framework for the post-war plans of public and private agencies.

Major objectives of a post-war program has been defined by the Board as "Full-Employment, Security and Building America." The agenda, prepared for discussion purposes, includes: Plans for Demobilization; Plans with Private Enterprise; Plans for Public Activity; Social Security; Effective Administration; International Collaboration, etc.

"Already," says the Board, "many agencies, governmental and private are at work preparing various elements of a post-war plan. Governors are using State planning agencies for this work or have set up special bodies for planning activities. A number of mayors have taken similar action. Private bodies like chambers of commerce and other civic organizations have active groups at work. Some of our largest corporations have a few men working on products to be made when once again civilian goods shall be the goal of our productive efforts. Within the Federal Government the major agencies have planning arms whose long-range studies envisage work to be done after the war."

# Future of Newsprint Viewed as Uncertain

## Order Freezing Production at Average of April-September Indicates a Decline of 9 Per Cent From 1941 Output—More Profitable Adjustment in Operations is Hoped For—Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., November 16, 1942—There is a good deal of uncertainty here as to what the future has in store for the newsprint industry, with the feeling prevalent that control of the output thus far achieved is only a preliminary stage in what may prove to be necessary war restrictions. The order freezing production as of November 1 to the monthly average of the period from April to September, 1942, will mean a decline of about 9% from last year's production. While this in itself is not serious there are other factors. The queston of labor, for instance, looms large, particularly labor in the woods. Military service and war industries have greatly depleted the available supply of woods labor. At the same time demand for lumber for war purposes has increased to such an extent that large forces of men have been switched from pulpwood cutting to the cutting of logs for sawmills. Then, again, the demand for pulp for many war purposes also threatens the continuance of the present flow of pulp to mills for manufacture into newsprint. There is, therefore, talk of further—and eventually perhaps drastic —curtailment of the manufacture and consumption of newsprint.

### More Equitable Adjustment Hoped For

All this, of course, intensifies the problems of newsprint operators attempting to maintain profitable operations, and hopes are being expressed that an upward adjustment in price schedules can eventually be worked out. On this point, the *Financial Times* of Montreal, says:

"Canadian newsprint manufacturers during the past year have made various attempts to obtain U. S. approval for a price increase for newsprint. One of the strongest arguments used was that wartime conditions had increased transportation costs considerably, and these have to be borne by the manufacturers. With production controls making profitable operations even more difficult, it is considered that the manufacturers' case is now even stronger, though as yet there has been no encouraging indication that any price change can be achieved.

"Operating against a price adjustment is the problem of publishers generally in operating profitably, under wartime conditions, and the publishers as a group have considerable strength at Washington. The logical sequence would be raising of advertising rates, but publishers now are having a problem in holding advertising, with present rates, with so many manufacturers, previously large advertisers, now engaged largely in war production and less immediately concerned in sales efforts."

### Issues Order on Birch and Maple Logs

By the last Order-in-Council relative to forest products, birch and maple logs are added to the list of products the exportation of which is prohibited excepting under permit from the Export Permit Branch of the Department of Trade and Commerce. Such exports, however, are exempted from requiring an export permit when shipped to any part of the British Empire, and newsprint is exempted from requiring a permit when shipped to any part of the Western Hemisphere, except to French Colonies or possessions in the Western Hemisphere.

Newsprint is included in the item "Paper other than waste, paper boards, fibre boards, paper and board manufactures" which products are all exempt from requiring an Export Permit when shipped to any part of the British Empire.

A large variety of other timber products are included in the control of export orders, unless they are shipped to any part of the British Empire.

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## Should Enforce Marking Agreement

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 18, 1942—A letter from the National Conference of Weights and Measures has been received by the State Weights and Measures Officials, which says:

"The Committee on Methods of Sale of Commodities, of the National Conference on Weights and Measures, has again given consideration to the quantity declaration for packages of facial and toilet tissues. The committee is of the opinion that the states should prepare to enforce the marking agreement reached in 1941 by the weights and measures officials and the tissue industry, and makes the following specific recommendations:

I. That each State empowered by law to do so, promulgate an official regulation embodying the terms of the marking agreement referred to above. (The agreement is set forth in the April, 1942, issue of the Weights and Measures News Letter beginning page 2).

II. That the regulation be made effective as of January 1, 1943.

III. That full publicity be given to the regulation among all interests involved in the marketing of facial and toilet tissues and that as of January 1, the regulation be enforced.

The foregoing recommendations are made in the conviction that ample time will be allowed manufacturers, distributors, and retailers to dispose of all improperly marked packages of facial and toilet tissues, and that there remains no good reason why, beginning on January 1, 1943, all packages of facial and toilet tissues offered for retail sale should not conform fully to the marking agreement.

It is also recommended by the committee that the State regulations include requirements:

(1) That folded facial tissues be compactly folded, that is, that the gaps between the edges of the sheets be held to a minimum and

(2) That the cartons be no larger than needed to hold their contents.

Prompt attention is urged in the promulgation of the regulations and in publicizing their import."

# Publishers Anxious About Newsprint Supply

## Restricted Operating Order Would Maintain Production in Canada to Middle of 1943, But Prospects Beyond That are Not Promising—Pulpwood Supply Dependent Upon Labor and Power Diversion.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., Nov. 16, 1942—It is understood Canadian publishers will meet here shortly to discuss newsprint supplies and the position of newspapers in the event of the possible necessity for a reduction in the use of newsprint in the not distant future.

It is noted here that American publishers are scheduled to again meet in Washington some time this month to discuss with the War Production Board the outlook for 1943. Since the War Production Board of the United States and the Canadian War-time Prices and Trade Board have been working so closely together, it is presumed that whatever is discussed at the Washington meeting will have its counterpart at the Toronto meeting, if and when held.

In spite of repeated assurance from the newsprint operators regarding supplies, newspaper publishers appear inclined to make their own estimates and make whatever preparations seem to them necessary to guard against any possible circumstance. If there is any one class of business people on this continent who is keenly aware of what an all-out war effort is likely to mean to business of all kinds, it is the newspaper publishers. They are in a strategic position for the appraisal of trends and are not likely to be caught napping. If newsprint is going to be in short supply in 1943, they are very likely able to see the situation approaching in time to take whatever remedial or ameliorative action possible.

### Freezing Order Reduces Production

The recent order freezing production at the average monthly rate prevailing between April and September, 1942, which is ordinarily the slack season of the year, meant a curtailment in operations of approximately 10% in Canada and it is understood a little less than that in United States mills. On the basis of this production volume, the apparent supply of newsprint available over the next year seemed sufficient to assure publishers of an adequate supply, providing, of course, that there was no further necessity for additional curtailment of electrical energy or diversion of manpower to other industries.

It is this uncertainty regarding what may happen in connection with electrical energy and manpower that gives the publishers pause. Recent weeks have witnessed a large proportion of pulpwood crews being diverted to logging for the lumber mills. Lumber has become such an important factor in the war effort that labor for logging is being given priority over other woods activities. That seems to indicate a dwindling of stock-piles of pulpwood before the end of next year and possibly much sooner.

The question in the minds of publishers is as to whether or not this diversion of labor, which has already been in short supply, would more than offset the 10% reduction in newsprint production. That question is tied in with whether or not newsprint operators would be likely to eat into their stockpiles to any great extent before limiting their operations still more, so that they could spread their operations as evenly as possible over the entire year.

It is estimated that the restricted scale of operations as it now stands can be maintained by Canadian mills up to at least the middle of 1943, but the prospects of carrying the present scale of operations much beyond that on available pulpwood stocks does not appear to be promising. By the end of this year, more accurate calculations can be made concerning pulpwood production and it will then be possible for newsprint operators to determine how far they can cut into their reserve stocks of pulpwood.

It is commonly accepted as likely that there will be a further reduction in operatons of both Canadian and United States mills beginning with the second quarter of next year. It may be that something may be done along this line at the meetings scheduled. Voluntary reduction of newsprint production is freely discussed. Some are urging that steps be taken as soon as possible to conserve the use of newsprint so as to help the manufacturer to conserve other materials. There is talk of limiting consumption to receipts of new stock and some opinion that publishers should be encouraged to increase inventories to the full 90 days' supplies permitted.

### Power Situation is Now Favorable

With reference to the power situation it may be noted that the Ontario Hydro-Electric Power Commission reports further gains in the peak power load. The greatest expansion was in the Niagara system, primarily due to growing war industry, where a gain of 213,137 h. p. is shown in primary peak load for September. This is 15% above the same period last year. Much the same trends are shown for combined primary and secondary peak loads. Firm power consumption in Canada during September was the highest ever recorded.

On the other hand water flow conditions in all principal watersheds in Canada are reported good.

The newsprint supply situation may be eased a little through another phase of war conditions. In spite of the greatly enhanced buying power of the public, the government's campaign against unnecessary spending is certainly showing results. This, in turn, is reflected in advertising schedules and ultimately may show up in newsprint consumption figures. The cost of living index figures have been published for another quarter and show an advance of only one tenth of one per cent.

In the meantime, those intimately connected with the newsprint and publishing industries are keeping close watch on electrical power usage, labor conditions and above all moves made by the various controllers under the W.P.T.B. The two latest orders from this source are tagged A-451 and A-454. The former, dated Oct. 26, brings under control the production, sale and shipment of newsprint, making all these phases subject to permit. Order A-454, October 28, stipulates: In any month from November on, no newsprint producer may manufacture a greater amount of newsprint than his monthly average in the period April 1 to Sept. 30. Control is also placed on the amount of newsprint which may be delivered.

# Set New Ceiling Prices on Toilet Tissue and Paper Towels

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 18, 1942—Cutting manufacturers' prices of toilet tissue and paper towels from levels of March, 1942, to those generally prevailing in October, 1941, the Office of Price Administration today issued a separate regulation setting ceilings for these products on all sales, whether made by the manufacturer, wholesaler or ultimate retailer.

The regulation reduces inflated margins which some wholesalers and distributors had obtained, and limits retailers to their March margins, thus insuring the consumer that the reductions in prices at the manufacturers' and distributors' levels will be passed on to him.

Hitherto the General Maximum Price Regulation set ceilings on toilet tissue and paper towels at levels of last March. Today's measure, Maximum Price Regulation No. 266—Certain Tissue Paper Products—replaces the General Regulation for these specified products. It is effective November 26, 1942, and establishes ceiling prices on the following basis:

### Effective November 26

1. For manufacturers, maximum selling prices are determined by a formula which takes into account chemical pulp content, basis weight, and area of paper. The formula is designed generally to hold manufacturers' prices to levels of October 1941.

2. For distributors, prices may not exceed the March mark-up over cost, or a sliding-scale percentage mark-up based on the size of the order, whichever price is lower.

3. For retailers, prices may not exceed those which are calculated by adding to the acquired cost a margin no greater than that which was taken in March 1942.

After cutting back manufacturers' prices, the regulation sets the maximum percentage mark-up for paper merchants based on the size of an order, as follows:

### Maximum Percentage Markups

| Toilet tissue: | *Per cent* |
|---|---|
| 1 to 2 cases | 45 |
| 3 to 9 cases | 27½ |
| 10 to 24 cases | 25 |
| 25 to 99 cases | 22½ |
| 100 to less than c/l | 17½ |
| Carload | 5 |

| Paper towels: | *Per cent* |
|---|---|
| Less than 2 cases | 65 |
| 2 to 5 cases | 40 |
| 6 to 24 cases | 27½ |
| 25 to 199 cases | 22½ |
| 200 to less than c/l | 17½ |
| Carload | 5 |

For wholesale grocers, the maximum mark-up is 17½ per cent and for wholesale druggists, 20 per cent.

In no instance may the distributor's mark-up exceed his mark-up for a similar sale in March, 1942.

Retailers may apply their March, 1942, mark-up to their new cost. Calculations must be made separately for each brand and for unit and multiple sales. If calculations result in fractions of cents, the retailer must take the next lower cent if the fraction is less than one-half cent. He may take the next higher cent if the fraction is one-half cent or more.

Cost studies by OPA show that this $90,000,000 industry realized gross profits in 1941 which more than offset increased costs during the year. Beginning in July, prices moved sharply upward until partially halted in December, 1941, by individual agreements between manufacturers and OPA. The studies indicate that manufacturers, with production and sales volume constant, will realize a slightly lower return under the new regulation than they did in 1941, when the returns were substantially greater than in 1940.

### Committee of the Industry Approves

The structure of the formula setting manufacturers' prices has been approved by an informal committee of representative members of the industry, cooperating with OPA on the industry's pricing problems. One feature of the formula is the provision placing a top limit on the manufacturers' maximum price at his highest selling prices last March, and a lower limit on the maximum price at 95 per cent of the manufacturers' prices on October 1-15, 1941.

This safeguard, which would come into operation only in exceptional cases, protects the consumer against any increase above March ceilings and protects the manufacturer from severe formula deviations which might set his ceiling too far below levels of October 1-15, 1941.

The manufacturer may, however, sell below the ceiling. The limitations of the formula do not provide a minimum selling price but merely a "minimum" maximum price for the manufacturer using the formula, OPA emphasized.

### Common Freight Charging Recognized

The regulation recognizes the two most common methods of charging freight. For those manufacturers who do not sell on a nationally delivered basis, a zoning basis is provided.

Manufacturers of toilet tissue selling on a nationally delivered basis, in using the formula, must initially determine in which class of four basis weights the article belongs. This automatically provides him a chemical pulp content price factor, as demonstrated in the following table:

TOILET TISSUE 4½" WIDE

| Basis weight 24 x 36—500 classes | Chemical pulp content: 100% bleached price factor X | 75%-99% price factor Y | Less than 75% price factor Z |
|---|---|---|---|
| 1. Less than 11.00 lbs. | $1.09 | $1.05 | $1.00 |
| 2. 11.0 to 11.99 lbs. | 1.15 | 1.10 | 1.05 |
| 3. 12.0 to 12.99 lbs. | 1.20 | 1.15 | 1.10 |
| 4. 13.0 lbs. and over | 1.26 | 1.20 | 1.15 |

The actual basis weight of the item from January 1 to the issuance of this regulation, or the basis weight ascribed by the manufacturer for that item during the same period, is to be used to determine the basis weight class of the item being priced.

The case price then is computed by multiplying the applicable price factor obtained from column X, Y, or Z by the number of linear inches of paper in the case, divided by 100,000.

For widths greater than 4.5 inches the price is increased proportionately, and for widths less than 4.5 inches the price is decreased proportionately. Facial type tissues are priced by adding 23 cents to the applicable price factor.

For manufacturers selling on a zone price basis the same formula is used except that zoning factors are added or subtracted from the applicable price factors. The zones differentials are in accordance with those recognized by the trade.

### Toilet for Army, Navy or Lend-Lease

Manufacturers producing toilet tissue for Army, Navy, or Lend-Lease may use f. o. b. mill prices, provided the appropriate adjustment in the price factors are made. Toilet tissue put up to conform to the new emergency alternate specifications in special waterproof envelopes containing 100 sheets is exempted from this regulation. Manufacturers maximum prices for these products are to be determined by the General Maximum Price Regulation.

Manufacturers of toilet tissue are required to mark plainly on each case of toilet tissue the basis weight, the chemical pulp class, sheet and roll count, and sheet size.

## Package Sizes for Fungicides

The proposed revision of Simplified Practice Recommendation R41-40, Package Sizes for Agricultural Insecticides and Fungicides, has been accorded the required degree of acceptance by the industry, and is to become effective November 1, 1942, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

As originally promulgated in 1926, the recommendation established a simplified schedule of package sizes for certain chemicals. The first revision, which became effective in 1938, embodied changes in package sizes, and amplified the schedule to include standard packaging for basic lead arsenate. In November 1939, the manufacturers submitted a second revision, further enlarging the scope of the recommendation to include packages for nicotine sulphate. This second revision was made effective August 1, 1940.

The current (third) revision, which has been approved by a large majority of the manufacturers as well as a representative group of distributors and users of agricultural insecticides and fungicides, consists primarily in the substitution of fiber containers to conserve metal, and in the elimination of several types of packages, Also, a simplified schedule of recommended standard packages for dry lime sulphur has been included in this revised simplified practice recommendation which will now be identified as R41-42.

Until printed copies are available, mimeographed copies of this simplified practice recommendation R41-42 may be obtained without charge from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

## New Ruling on Board Products

WASHINGTON, D. C., November 18, 1942—OPA has authorized manufacturers of paper board products, who now are required to determine maximum prices by estimating raw material costs and other factors, to use their published price lists of October 1941 to establish their ceiling prices.

Specifically, Amendment No. 1 to Maximum Price Regulation No. 187 (Certain Paper board Products), freezes the October 1941 price lists and provides manufacturers who sold in accordance with such lists an alternate and simpler method of determining maximum prices. From the outset the regulation has used October 1941 as the base pricing period.

The amendment also brings under the control of the Regulation several new products such as rectangular set-up and flat "pure-pak" milk containers, and wedge shaped pails formed on a Brightwood or similar type machine.

In order to provide manufacturers a more effective method of determining margins, the amendment sets forth in more detail the margins which they may use in determining selling prices, and particularly describes the method for computing margins on sales of commodities not sold during October, 1941 or on sales to purchasers with whom no business was done during the base month. If the manufacturer sells the same commodity or service to the same purchaser as he did during October, 1941, his margin computed now must be no greater than during the base period, but if no such sale was made the manufacturers shall use the margin used in determining the selling price of the same or comparable commodity to a purchaser of the same class.

The measure clarifies "Purchaser of the same class" as defined in the regulation, so that a manufacturer is permitted to adjust his customary differentials between the class of buyer who purchased in October and the one who did not purchase in the base period. In effect it directs the manufacturer to go back to the nearest prior period before the base period in which both buyers made purchases and to maintain the marginal relationship which existed then between the two purchasers.

The action also corrects the definition of hourly piece and setting-up rates, as set forth in the Regulation. Originally these were defined as the highest "costs" from October 1 to October 31, 1941. This was changed to read highest rates.

## J. B. Strobridge Made Secretary

CINCINNATI, Ohio, November 16, 1942.—Stockholders of The Johnston Paper Company, 2060 Reading Road, yesterday placed John B. Strobridge on their board of directors, who, in turn, elected him to the position of secretary and sales manager.

Other officers of the company are Henry M. Zimmerman, president and treasurer and E. H. Vollmer, vice president. Mr. Strobridge has been connected with the paper trade either directly or in the allied industry of lithography since 1911. At the present he is very active in waste conservation affairs being on the Executive Committee of the Hamilton County Waste Materials Conservation Committee and co-chairman of the Industrial Salvage Groups.

The Johnston Paper Company deal in fine papers for the printing and lithography trades, as well as business papers of all types and specialties for war industries.

# Obituary

## Walter Wyman

AUGUSTA, Me., November 15, 1942.—Walter Scott Wyman, prominently connected with the paper industry and who built the Central Maine Power Company from a $1,500-a-year business to a $7,000,000-a-year corporation, died today of a heart attack in the midst of negotiations for a $113,000,000 utility merger of which he was to be president. He was sixty-eight years old.

Mr. Wyman, born at Oakland, Me., began his business career as assistant superintendent of the Maine Water Company in 1899, served briefly as general manager of the Waterville, Fairchild and Oakland Railroad, and established his light and power business in 1901 under the name of the Messalonskee Electric Company. The name was changed in 1910 to its present title.

Mr. Wyman has been a party to numerous utility and manufacturing company mergers and developments. The current negotiations to bring the Cumberland Light and Power Company and the Central Maine Power Company together would have been his largest operation. The firms are the two largest utilities of the state. He was president of both.

Mr. Wyman was also president of the New England Public Service Company, owning stocks of various utilities and manufacturing concerns in Maine, Vermont and New Hampshire. He was president of the Maine Seaboard Paper Company, the Public Service Company of New Hampshire, a trustee of the Augusta Water District and Colby College.

He was a fellow of the American Institute of Electrical Engineers, and a member of the American Electrochemistry Society, the New England Water Works Association and the Union League Club of New York.

## David W. Haering

David W. Haering, president of D. W. Haering & Co., Inc., died after a brief two-day siege of pneumonia at the West Suburban Hospital in Oak Park, Ill., on Friday, October 30, 1942.

David Haering was born in Chicago on February 3, 1908, the son of George Victor and Elizabeth S. Haering. He attended the Chicago grammar schools, the Austin High School, and was graduated from the University of Illinois in 1929 with a Ph. C. degree. Among his many hobbies were baseball, journalism, first editions, and dogs. He was married to Vera Wilson in 1938 and his wife, his father, and two sisters survive him.

D. W. Haering developed the company through a period of depression from a one-man organization into a well established corporation having headquarters at 205 West Wacker Drive, a factory, control, and research laboratories in Chicago, and technical offices in the principal industrial cities of the United States.

Mr. Haering was the president and technical director of the company bearing his name and was also an outstanding authority on scale and corrosion. The company acts as water consultants for many large industrial corporations. Under his direction the research laboratories of D. W. Haering & Co. discovered and developed twenty-eight different organic glucosides for the control of scale and corrosion in aqueous systems.

## Lionel A. Walden

Funeral services for Lionel Arnold Walden, member of the trade paper publishing firm of Walden, Sons & Mott, Inc., 41 Park Row, New York, was held from his late home, 82 Marlborough Court, Rockville Centre, L. I., November 17. Mr. Walden died at his home Sunday morning of pneumonia. He was 54.

Mr. Walden was born in Holyoke, Mass., the son of the late Mr. and Mrs. Charles C. Walden. Early in his business career he became a member of the advertising staff of the Walden Publishing Company, his father's firm. After several years in the Chicago office, he renewed his coverage of the New England trade when the Walden Publishing Company and the Walden-Mott Company merged under the present corporate name.

A member of the Rockville Centre American Legion Post, Mr. Walden served in the U. S. Navy during World War I on the U.S.S. George Washington which, on one of its trips, carried President Woodrow Wilson to the Peace Conference held in Paris. Active for a number of years in the Graphic Arts, Mr. Walden was a member of the Paper Club of New York.

He is survived by his wife, Mrs. Adele Walden, two sisters, Mrs. Ethel P. Howard of Chicago, and Mrs. Mabel Reed of Ridgewood, N. J., and three brothers, Tom of Ridgewood, Charles C. of Stoneridge, N. Y., and Van R. Walden of Glen Rock, N. J. Interment was in Valleau Cemetery, Ridgewood, N. J.

## Bennet B. Bristol

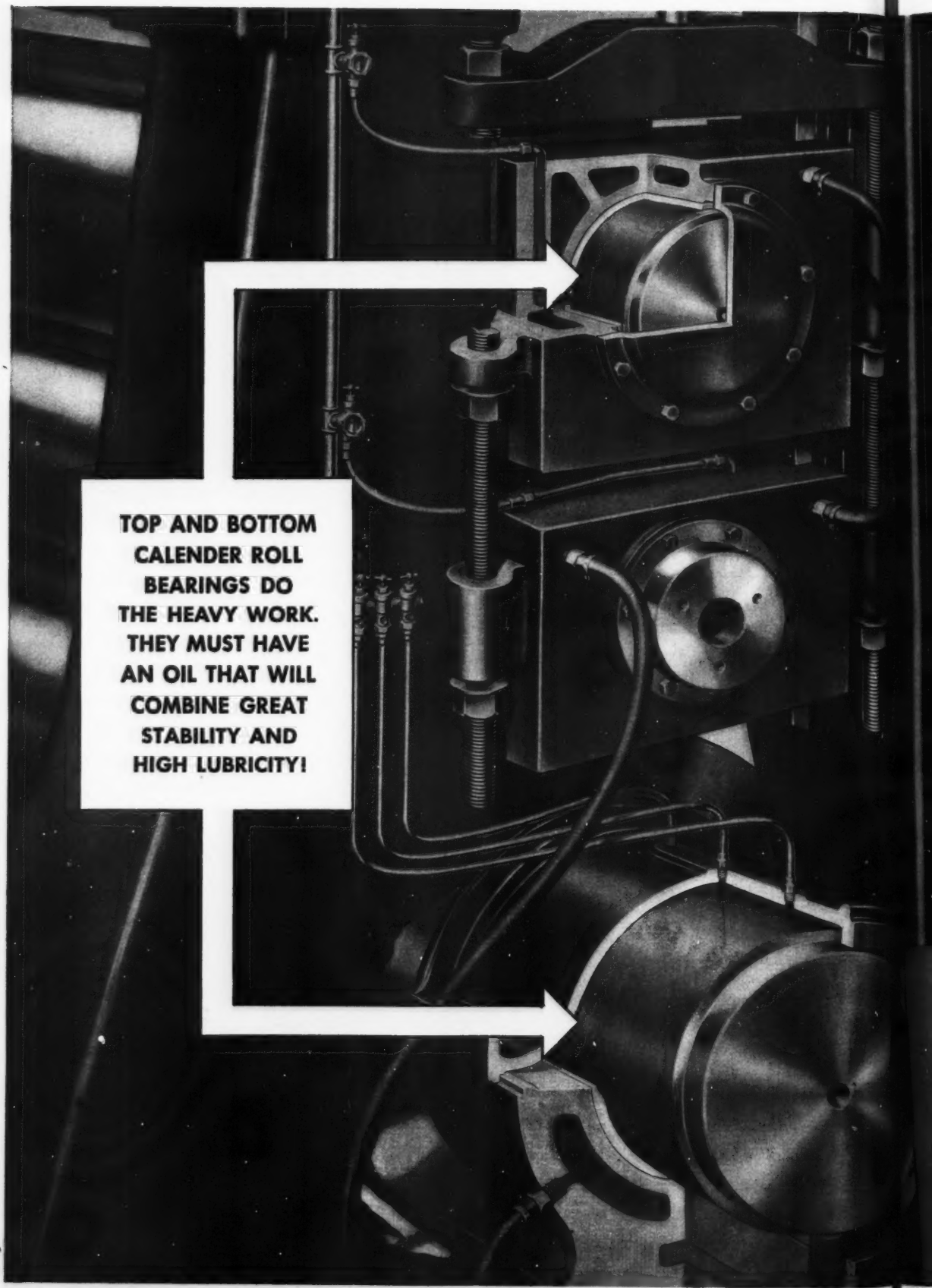
Bennet B. Bristol, who with his brother, Edgar H. Bristol, founded the Industrial Instrument Company, in 1908, which later became The Foxboro Company, died at his summer home at Falmouth Heights, Mass., on November 10, following several months' rest from a heart attack, suffered last May. Mr. Bristol was born in Naugatuck, Conn., May 3, 1868. In 1893 he was graduated, M.E., from the Stevens Institute of Technology. Throughout the history of The Foxboro Company he served as its Treasurer and Clerk. He was President of the Foxboro National Bank, a director of the Citizens and Manufacturers National Bank of Waterbury, Conn., Chairman of the Board of Trustees of the Foxboro State Hospital, and took an active part in the affairs of his church and community. He is survived by a brother and a sister, his widow, his six children and nineteen grandchildren. Funeral services and burial were at Foxboro, Mass.

## Emery St. George

Emery St. George, 50, of Hollingsworth & Vose Company, East Walpole, Mass., died at the Baker Memorial Hospital, Boston, November 11. Burial was at Plymouth, Mass.

Born in Plymouth, Mass., Mr. St. George was connected with the sales department of Hollingsworth & Vose Company for the past 12 years. Prior to his association with this concern he was traffic

*(Continued on page 37)*


TOP AND BOTTOM
CALENDER ROLL
BEARINGS DO
THE HEAVY WORK.
THEY MUST HAVE
AN OIL THAT WILL
COMBINE GREAT
STABILITY AND
HIGH LUBRICITY!

# Beware of Too Much "Friction-Heat"

## A CORRECT ANSWER TO OPERATING HAZARDS ON CALENDER ROLL BEARINGS:

*Problem:* On calenders and super-calenders, the top and bottom bearings do the heavy work. These bearings are subject to crushing pressures. Unless these bearings receive correct lubrication, "friction-heat" may cause expansion of roll ends — and excessive bearing wear. This results in "soft-nosed paper rolls," "crowding," time out for replacements and costly repairs.

*Answer:* Modern calender stacks are lubricated by circulation systems. This means full flood lubrication with the oil being used over and over again. To stand up under the heavy pressures and give long life, you need an oil with great stability and high lubricity.

*Gargoyle Vacuoline Oils* were specifically developed for this type of service. These oils have been tested extensively in severe service. The results have proven that Vacuoline Oils have an exceptionally strong combination of stability and lubricity.

TO HELP MAINTAIN WARTIME PRODUCTION, CALL IN

# SOCONY-VACUUM for "Correct Lubrication"

GARGOYLE Lubricants

SOCONY-VACUUM OIL CO., INC. — Standard Oil of N. Y. Div. — White Star Div. Lubrite Div. — Chicago Div. — White Eagle Div. — Wadhams Div. — Southeastern Div. (Baltimore) — Magnolia Petroleum Company — General Petroleum Corporation of Calif.

# CONCENTRATION PLANS WOULD CREATE HAVOC

*(Continued from page 7)*

the selling company was required to pay income taxes on the par value of the stock, making a total of $500,000 instead of $250,000 actually received. The additional assesment was reversed by Judge Alvin C. Reis of the Dane County Circuit Court on December 30, 1941. The case was appealed to the Supreme Court, and the decision of the lower court was sustained.

Dismissal of a suit brought by two stockholders of the former Tomahawk Pulp and Paper Company, Tomahawk, Wis., also was sustained by the Supreme Court. The plaintiffs sought to recover $1,700,000 from four defendants who were charged with conspiracy to prevent the company from reorganizing and who took over the properties. The plaintiffs were Della A. Pride and E. C. Smith, and the defendants were the First Trust Company, Appleton, Wis., the Tomahawk Kraft Paper Company, Tomahawk, Wisc., the Wisconsin Public Service Corporation and the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.

The firm went into bankruptcy in 1931 and passed out of existence in 1938 when it failed to renew its corporate charter.

The original suit was dismissed by Judge J. R. McCarthy of the Circuit Court at Appleton, Wis., on the grounds that only the trustee in bankruptcy was the only one entitled to bring a recovery action and that the company, having no property, could not be slandered. It was also maintained that a recovery suit was barred by the statute of limitations.

### Kimberly-Clark Safety Campaign

In the first month of a safety campaign at the Lakeview mill of the Kimberly-Clark Corporation, Neenah, Wis., eight of twenty-one departments made perfect scores. The drive aims to conserve manpower in order to make possible the release of more material for the war effort. It seeks a reduction of on and off duty accidents and absences because of sickness. The contest continues during November and December.

### Shipping Record Expected

When navigation on the Fox River closes later this month, a record is expected to be established for the amount of shipping accomplished in order to stock the paper mills with coal and other products in avoidance of transportation bottlenecks. Coal shipments have averaged 48,000 tons per month by the barge lines. Tugs have been operating day and night to overcome a cessation of traffic in the spring when high water conditions made navigation impossible. Operations will be continued right up to the winter freezup.

### J. S. Sensenbrenner Commissioned a Major

John S. Sensenbrenner, who resigned several months ago as sales manager of the Kimberly-Clark Corporation, Neenah, Wis., has been commissioned as a major in the United States service of supplies for the Army Air Corps. He expects to be called to Washington within a few days to receive his assignment to active duty. Mr. Sensenbrenner served as a private in the regular army during the first World War.

### York Coleman Appointed By WPB

York Coleman, former manager of the stores department of the Menasha Products division of the Marathon Paper Mills Company, Menasha, Wis., has been appointed district manager of the material redistribution department of the War Production Board. His headquarters will be at Jacksonville, Fla. The new agency will re-allocate critical materials in the war effort where such materials cannot be placed immediately into production.

### Casey-Alexander Nuptials

Miss Ardean Alexander, daughter of Mr. and Mrs. John E. Alexander, Port Edwards, Wis., and Samuel A. Casey of Chicago, were married Saturday, November 7, at the Community church at Port Edwards. A reception was held afterwards at the home of the bride's grandmother, Mrs. L. M. Alexander. The bride's father is president and general manager of the Nekoosa-Edwards Paper Company. Mr. Casey is an attorney and is now serving with the United States Army.

## WPB Curtails Wallpaper Output

WASHINGTON, D. C., Nov. 18, 1942—WPB has issued an order providing for the direct practices, reducing the number of styles and colors of wallpaper, according to the Director General for Operations.

The war-time limitations under the restriction of private house construction and the shut-down of many non-essential industries were factors considered in determining the extent of the curtailment.

The new order, L-177, and Schedule 1 attached thereto, provides that no manufacturers shall purchase or put in process paper stock in excess of 50 percent of the total tonnage of such stock used by him in the production of wallpaper in the period July 1, 1941 to June 30, 1942.

L-177 also provides for simplification and standardization practices which include the provision that no manufacturer shall use paper stock exceeding 19¼ inch in width to trim to 18 inches, or use paper stock in excess of base weight previously employed by him.

It further provides for a reduction of styles on a percentage basis of the number produced by the individual manufacturer during the 1941-1942 period. Ground color variations of red, green, blue and yellow are limited to certain color classes designated in "Munsell Book of Colors Abridged" (1929 edition).

It is estimated that the order provides for a saving of 73,411 tons of base paper stock, in addition to large tonnages of size materials, chemicals, colors, clay and other processing materials. Reduction of the demand made upon transportation facilities and upon repair and maintenance and other items of supply should affect a tremendous saving in the country's war-time economy.

The order will affect 42 wallpaper manufacturers, approximately 750 distributors and wholesalers of wallpaper, and 10,000 retail outlets.

# FINANCIAL NEWS

### New York Stock Exchange

High, Low and Last for Week Ending November 14, 1942

STOCKS

| | High | Low | Last |
|---|---|---|---|
| A. P. W. | 1½ | 1½ | 1½ |
| Armstrong Cork Co. | 30⅜ | 28¼ | 30⅜ |
| Celotex Corp. | 7⅜ | 7⅜ | 7⅜ |
| Celotex Corp., pf. | 70¾ | 70 | 70 |
| Certain-Teed Products Corp. | 3⅜ | 2⅜ | 3⅜ |
| Certain-Teed Products Corp., pf. | 32¼ | 28 | 30½ |
| Champion Paper & Fibre Co. | 18¾ | 18¾ | 18¾ |
| Champion Paper & Fibre Co., pf. | 100½ | 100 | 100 |
| Congoleum Nairn Co. | 17¼ | 16¾ | 16⅞ |
| Container Corp. of America | 16 | 15½ | 15¾ |
| Continental-Diamond Fibre Co. | 7¼ | 7 | 7 |
| Crown-Zellerbach Co. | 11⅜ | 11⅜ | 11⅜ |
| Crown-Zellerbach Co., pf. | 84 | 83 | 83 |
| Dixie-Vortex Co. | 9½ | 9¼ | 9½ |
| Dixie-Vortex Co.—A. | 37 | 35 | 35 |
| Flintkote Co. | 13⅞ | 13½ | 13⅝ |
| Robert Gair | 1⅞ | 1¾ | 1⅞ |
| Robert Gair, pf. | 9⅞ | 9½ | 9⅝ |
| International Paper Co. | 9¾ | 8¾ | 8¾ |
| International Paper Co., pf. | 49⅞ | 47 | 47 |
| Johns-Manville Corp. | 67¾ | 65 | 67¾ |
| Johns-Manville Corp., pf. | .... | .... | .... |
| Kimberly Clark Corp. | 27 | 25 | 25½ |
| MacAndrews & Forbes | 18¼ | 18¼ | 18¼ |
| MacAndrews & Forbes, pf. | .... | .... | .... |
| Masonite Corp. | 29 | 28¼ | 28¼ |
| Mead Corp. | 6½ | 6¼ | 6¼ |
| Mead Corp., pf. | .... | .... | .... |
| Paraffine Companies, Inc. | 32 | 31⅝ | 31⅝ |
| Paraffine Companies, Inc., pf. | 100 | 100 | 100 |
| Rayonier, Inc. | 9⅞ | 9¾ | 9¾ |
| Rayonier, Inc., pf. | 26½ | 26 | 26 |
| Ruberoid Co. | 18¾ | 18½ | 18½ |
| Scott Paper Co. | 38 | 37½ | 37½ |
| Scott Paper Co., pf. | 110¼ | 110¼ | 110¼ |
| Sutherland Paper Co. | 23½ | 23 | 23½ |
| Union Bag & Paper Corp. | 8¾ | 8 | 8⅛ |
| United Paperboard Co. | 3⅜ | 3⅜ | 3⅜ |
| U. S. Gypsum Co. | 60 | 57½ | 58½ |
| U. S. Gypsum Co., pf. | 174 | 174 | 174 |
| West Virginia Pulp & Paper Co. | 13½ | 13 | 13 |

BONDS

| | | | |
|---|---|---|---|
| Abitibi Pulp & Paper Co. 5s '53 | 49½ | 49½ | 49½ |
| Celotex Corp. 4½s '47 | 98⅜ | 98 | 98⅜ |
| Certain-Teed Products Corp. 5½s '48 | 94 | 92 | 92 |
| Champion Paper & Fibre Co. 4¾s '50 | 102⅛ | 102⅛ | 102⅛ |
| International Paper Co. 6s '55 | 105 | 104⅞ | 104⅞ |
| International Paper Co. 5s '47 | 103 | 102½ | 103 |
| Mead Corp. 4½s '55 | .... | .... | .... |
| West Virginia Pulp & Paper Co. 3s '54 | .... | .... | .... |

### New York Curb Exchange

High, Low and Last for Week Ending November 14, 1942

STOCKS

| | High | Low | Last |
|---|---|---|---|
| American Box Board Co. | 4⅜ | 4⅜ | 4⅜ |
| Brown Co., pf. | .... | .... | .... |
| Great Northern Paper Co. | 27 | 27 | 27 |
| Hummel-Ross Fibre Corp. | 3⅜ | 3⅜ | 3⅜ |
| National Container Corp. | 9¼ | 9⅛ | 9⅛ |
| St. Regis Paper Co. | 1⅞ | 1⅝ | 1¾ |
| St. Regis Paper Co., pf. | 121½ | 114½ | 120 |
| Taggart Corp. | 2¾ | 2¾ | 2¾ |

BONDS

| | | | |
|---|---|---|---|
| American Writing Paper Co. 6s '61 | 84½ | 84 | 84¼ |

## Hinde & Dauch Profits Off

The Hinde & Dauch Paper Company and consolidated domestic subsidiary for the nine months of September 30, reports a net profit of $739,818, equal to $1.68 a common share, against $984,892 or $2.36 a common share last year. Provision for estimated Federal taxes totaled $1,890,000.

## U. S. Gypsum Loses

The United States Gypsum Company and subsidiaries, for the nine months ended September 30, 1942,, reports net income of $3,878,148 after taxes and charges, equal after preferred dividends to $2.90 a share on 1,196,373 common shares; year ago $5,045,-658 and $3.88 a share on 1,195,662 shares.

## Puget Sound Earns $1.16

The Puget Soud Pulp and Timber Company reports $428,429 net profit for the first nine months of 1942, after providing $1,837,964 for Federal taxes. Net profit for the period was equal to $1.16 per common share; tax provisions equalled $5.62 a share.

For the comparable period of 1941 revised net profit of $761,501 represented $2.18 per common share, after taxes of $1,448,311 which equalled $4.43 a share.

Pulp production of 128,169 tons constituted an increase of 26,186 tons over the comparable 1941 period. Net sales of $7,328,500 scored a gain of $1,392,638. Earnings before tax provisions were $2,266,393, or $56,581 higher than in the first nine months of 1941.

Anticipating higher tax rates in the 1942 revenue act, in the third quarter the company increased its tax provision to 80% of operating earnings. This rate consumed $505,717 as taxes on third quarter earnings of $627,709; and $131,095 additional was provided for taxes against earnings of the first six months.

Acute situations involving manpower, log supply and transportation facilities prevent continuance of capacity operations by the company, notwithstanding the fact that the Pacific Coast pulp and paper industry was recently declared an essential industry by the War Manpower Commission.

Pulp production at the Bellingham plant was reduced to 75 per cent of capacity on October 1, 1942, and to about 50% on November 1st. These curtailments complied with requests of the War Production Board and permitted allocation of manpower and logs among other essential war industries.

Effect on fourth quarter net profits should not be in full proportion to output reduction, the company's report states, since the only earnings affected are those subject to 90% excess profits tax.

## Mead Corp. Earns 16 Cents

The Mead Corporation and subsidiaries for the sixteen weeks to October 3, reports a net profit of $245,074, or 16 cents each on 692,889 common shares, against $651,646, or 83 cents on 625,000 common shares, for sixteen weeks to October 4, 1941. Forty weeks to October 8: Net profit, $1,-112,242, or $1.23 a common share, against $1,418,-004, or $1.72 a common share, for 1941 period. Figures include operations of Escanaba Paper Company from August 31.

## Northern Mills Bond Issue Sold

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., November 16, 1942—Chicago interests played an important role in the recent private placement by the Northern Paper Mills of a new issue of $1,500,000 Series A first mortgage 4¼% bonds, the arrangements being made through three life insurance companies. The bonds will mature $150,000 annually from 1948 through 1957.

In connection with the financing the company's

term bank loans have been increased to $640,000 due in quarterly installments of $32,000 each from February 1943 through November 1947. It is understood that a major part of the proceeds of the financing will be used to redeem all of the company's outstanding $1,440,000 of first mortgage 5% serial gold bonds, series of 1928. The balance will be used for working capital for the Green Bay company.

## Brown Co. Nets $906,190

The Brown Company reports for the first 44 weeks of its first fiscal year following reorganization, a net profit of $906,190 after a provision of $1,200,000 for estimated income and excess profits taxes.

Working capital, after repayment of $1,878,836 on the RFC loan and after transfer of $1,284,930 bonds interest from long-term debt to current liabilities, was $5,567,976 on Oct. 3.

Brown Corporation, the wholly-owned Canadian subsidiary, had a net profit for the 44 weeks of $872,571 in Canadian funds.

## Certain-teed Profits Lower

The Certain-teed Products Corporation and wholly owned subsidiaries for the nine months to September 30, reports net profit after $1,173,202 reserve for Federal and Canadian income and excess profits taxes was $800,797, equal to $10.96 a share on 6% preferred stock on which unpaid dividends approximated $33 a share on September 30, last. Net profit for period in 1941 was $1,145,665 or $15.68 a share on 6% preferred stock after $669,862 tax provision.

## M. & O. Nets $268,251

The Minnesota and Ontario Paper Company for the September quarter, reports a consolidated net income of $268,251, compared with $1,163,443 for third quarter of 1941; net sales, $5,514,713, against $6,012,252. Nine months: Consolidated net income, $992,326, against $1,163,443 last year; net sales, $17,828,046, against $15,585,780.

## United Paperboard Earns 1 Cent

The United Paperboard Company and subsidiaries for the three months ended August 29, 1942, reports sales of $755,971 compared with $1,323,139 a year ago; net income $14,322 after taxes and charges, equal after preferred dividends to 1 cent a share on 240,000 common shares; a year ago $85,091 and 30 cents a share.

## Dixie-Vortex Earns $2.10

The Dixie-Vortex Company for the twelve months to September 30, reports a net profit of $871,770, equal after dividend requirements on Class A stock, to $2.10 a share on the common, against $925,450, or $2.36 a common share for the twelve months to September 30, 1941.

## Northern Paper Votes Dividend

The Northern Paper Company announced a dividend of 50 cents for payment on Dec. 1. Payments this year total $2 with the current declaration, against $2.50 distributed last year.

## Sealright Workers Seek Injunction

FULTON, N. Y., November 14, 1942.—Judge Ernest I. Edgcomb is the official referee in an action seeking a temporary injunction by a number of former employees of the Oswego Falls Sealright Corporation which was started this week at Syracuse. The petitioners seek a temporary injunction to prevent both the local and International Brotherhood of Pulp, Sulphite and Paper Mill Workers from interfering with their exercise of rights as members, from issuing any notices of expulsion, and to declare void expulsion orders received by several with demand for their reinstatement. Twenty-six former members of the concern are involved in the action. The action is the result of a brief walkout at the Sealright plant last spring following the discharge of Seward Small, who was president of the local union at that time. John P. Burke, president of the organization and John Lincoln, president of the local, are named defendants with both unions. The hearing lasted more than two hours when an adjournment was agreed upon until November 23. During the intervening period a decision will be made whether the action in which the temporary restraining order is asked will go to trial on that date before Judge Edgcomb. Sidney Greenberg represented the petitioners while John J. Walsh appeared for the organization.

## Williamson Petition Dismissed

SCRANTON, Pa., November 16, 1942—Federal Judge Albert L. Watson has handed down an order dismissing a petition for reorganization of the Williamson Pulp and Paper Company, Austin, Potter County. The order also provided for the vacating of restraining orders handed down some weeks ago against the transfer or sale of equipment and other assets other than those sold in the normal course of business.

Judge Watson was asked to lift the restraining orders because the company owns a huge boiler and other equipment which is badly needed in war production work. The jurist indicated at that time that he was reluctant to lift the order until the company posts $90,000 security to protect protesting creditors, J. P. Eyre Price, regional manager for the War Production Board appeared before Judge Watson to testify to the urgent need for the equipment in war work.

The company contends that it can obtain $137,500 for the boiler and other equipment.

## Kalamazoo to Hold Joint Meeting

The Eighth Annual Joint Meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association and the Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry will be held on Thursday, January 7, 1943 at the Park-American Hotel in Kalamazoo.

This traditional gathering of paper mill men which is attended by national officers of both associations, mill presidents, superintendents, foremen, chemists, beater engineers, technical operating men, purchasing agents, salesmen and others of the industry has become, with the exception of national conventions, the outstanding and best attended annual event of the paper industry.

# The Trade-Mark of WATERBURY FELTS

**When you see this Waterbury trade-mark on a felt, it is your assurance of**

**RELIABILITY**
**FINEST QUALITY**
**LONG LIFE AND**
**DEPENDABLE SERVICE**

**Our long experience in producing felts and our nation-wide reputation for high quality and absolute dependability are behind every felt showing this trade-mark.**

*The* WATERBURY FELT CO.

SKANEATELES FALLS, N.Y.

# CONSTRUCTION NEWS

*Under limitations order L-41 all projects involving expenditures of more than $5,000 must be specifically approved by the War Productions Board. The status of projects reported herewith under the provisions of the order is not known.*—EDITOR.

**Crichton, Ala.**—R. E. Hartman, president of the Mobile Paper Mill Company, writes as follows: "We refer to Construction News, page 16, of the November 5 issue of PAPER TRADE JOURNAL. The item with regard to plant addition here is not correct. We are not expanding."

**Milwaukee, Wis.**—Hummel & Downing Company, 1514 East Thomas avenue, manufacturer of solid fiber boxes and containers, has taken out a permit for one-story addition. No estimate of cost announced. General erection contract has been awarded to Edward Steigerwald & Sons, Inc., 5310 West State street, and work will proceed at once.

**Little Rock, Ark.**—Arkansas Paper Company, 620 East Markham street, commercial paper goods, plans rebuilding of portion of storage and distributing plant, recently destroyed by fire, with loss reported close to $50,000, including building, equipment and stock.

**Green Bay, Wis.**—The Northern Paper Mills, Day street, manufacturers of tissue and other paper stocks, have work in progress on new addition to mill, recently referred to in these columns, and are carrying out construction by day labor. It is expected to have structure ready for service at early date. No estimate of cost announced. H. W. Gochnauer is chief engineer at mill, in charge.

**Kansas City, Mo.**—Fire recently damaged a portion of plant of Industrial Paper Stock Company, 136 Main street, waste paper products, including shredding machine department. No estimate of cost announced. It is planned to replace fire loss at early date.

**Chicago, Ill.**—The Celotex Corporation, 120 South LaSalle street, manufacturer of insulating materials, has developed several new products now in regular commercial production at mills, including a corrugated siding to replace steel sheets, required in the war program, formed of heavy felt saturated with a recently developed resino-bituminous compound; these are hard, rigid and moisture-proof, and extremely light in weight. Also, a new laminated gypsum wallboard panel, as well as an exterior sheet siding of similar basic material. The new specialties are being used in connection with military cantonment construction and are on a heavy production schedule.

**Springfield, Mass.**—The United States Envelope Company, 21 Cypress street, manufacturer of commercial and other envelopes, etc., has let general contract to F. E. Treuchet, 34 Wareham street, Springfield, for alterations and improvements in part of mill. No estimate of cost announced. Work will be carried out at once.

**Random Lake, Wis.**—The Badger Tag Company, manufacturer of paper and paperboard tags, labels, etc., has work under way on new one-story addition, about 16 x 45 feet, to be used for offices and other operating service. No estimate of cost announced. General erection contract was let reecntly to Arthur Schulz, Random Lake.

**Richmond, Va.** — The Randolph Paper Box Company, 1313 East Grace street, manufacturer of folding paper boxes and containers, has completed establishment of two new branch plants, recently referred to in these columns, located on East Franklin street, Richmond, and at Victoria, Va., respectively, and units have been placed in regular operation. About 100 employes are engaged at each plant, both of which will develop maximum output. Main plant at first noted location also is running on a capacity schedule.

**Minneapolis, Minn.**—The Bemis Brothers Bag Company, 600-20 South Fourth street, manufacturer of paper bags and containers, etc., is making improvements in plant, for which contract recently was let to Northwestern Construction Company, 1401 Third avenue South. No estimate of cost announced.

**Chicago, Ill.**—The Wilson-Jones Company, 3300 West Franklin street, manufacturer of loose-leaf paper stocks, etc., has converted a large part of its main plant, as well as branch plants in different parts of country, for production for Government, including installation of additional equipment and facilities for this purpose. Output is being used by army, navy, air corps and other Federal departments. Company is using formed fiber and case board, as well as wood and certain plastics as a substitute for steel specialties as previously utilized.

**Tacoma, Wash.** — St. Regis Paper Company, Kraft Pulp Division, Tacoma, has discontinued operations at local mill, in accordance with recent general order of WPB, affecting all mills in Puget Sound district. It is expected that the order for shut-down will continue for the duration of war.

## Packerack Mill Sold

The Hopper Paper Company of Taylorville, Ill., purhased last week the Packerack Mill of Reading, Pa., from the Acme Paper Board Company of Bogota, N. J. The mill is idle now and the Hopper Paper Company has no definite plans as to future operations of the plant as yet.

## Scott Starts Poster Health Campaign

Scott Paper Company, Chester, Pa., is conducting a new poster campaign aimed at arousing wartime industry to health conservation. The campaign uses the slogan "Health Is Ammunition Too." The posters are in red, white and blue and are suitable for bulletin board use and other display purposes. The company also is issuing a booklet listing sixty-five ways to check the health and accident prevention progress in industrial plants.

## Paper Awards

WASHINGTON, D. C., November 16, 1942—The Government Printing Office announced the following awards for paper:

Collins Manufacturing Company will furnish 173,034 pounds of 25% rag white ledger paper at 9.94 cents per pound; Whiting Paper Company will furnish 3,879 pounds of 50% rag white ledger paper at 14 cents per pound; Cauthorne Paper Company will furnish 28,798 pounds of white offset paper at 7.75 cents per pound.

Marquette Paper Corporation will furnish 2,000,000 pounds of safety sulphite writing paper at 5.73 cents per pound; The Chillicothe Paper Company will furnish 2,000,000 pounds of safety sulphite writing paper at 5.79 cents; and the Fitchburg Paper Company will furnish 1,500,000 pounds of safety sulphite writing paper at 5.92 cents per pound.

R. P. Andrews Paper Company will furnish 2,500,000 pounds of safety sulphite writing paper at 5.74 cents per pound; Whiting Paper Company will furnish 23,936 pounds of 25% rag white ledger paper at 11.98 cents per pound; Bulkley, Dunton & Company will furnish 40,000 pounds of white 25% rag bond paper at 10.14 cents per pound.

## Swedish Paper Situation

WASHINGTON, D. C., November 18, 1942—From Sweden comes a report to the Commerce Department that the raw material situation in the paper and board industries is deteriorating. Most of the accessible markets, it is stated, are little inclined to export to Sweden any goods of importance, and the prices of imported goods have at the same time risen considerably more than those of the products.

This situation has led to a noticeable falling off in Swedish paper exports, although incoming reports indicate a need for very large quantities of paper, cardboard and carton paper in all available markets.

There is a marked shortage of newsprint in practically every country. Argentina and Chile are now the only oversea markets to which Swedish exports of newsprint are possible. Denmark is the principal European country to receive Swedish paper. Production of newsprint during the last few months has increased somewhat but it is still far below normal output.


**REFILLING IS AN IMPORTANT PART OF OUR SUPER-CALENDER ROLL BUSINESS**

**● Today it is very important. New rolls are hard to get. So take extra care of the rolls you have. When they need refilling, send them to us. We will return them ready to give you new roll performance. In our complete selection we have the right filling for your papers on your rolls for your calenders.**

## Australian Mill Starts

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 18, 1942—The new mill of Cellulose Australia Limited, near Millicent, South Australia, has now begun production of pulp and paper boards, according to a report received by the Department of Commerce. Among the first products of the mill will be cardboard made from waste paper collected to aid the Red Cross Fund. Output will later extend to wood pulp board, leather boards; and manila and grayboards. When production began the number of employees was approximately 200.

In reference to Western Australia, it is stated that a new enterprise recently developed in Perth by a local syndicate is the manufacture of paper from scrap paper. The new mill is producing all types ranging from toilet lines to strawboard and newsboard.

# PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Vol. 115 November 19, 1942 No. 21


## COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

## WAR PSYCHOLOGY

American political, social and industrial progress is a notable record of achievements contributed by countless men and women. Only a comparatively few of these persons have become famous. For the most part, those who have helped and continue to assist in the progress and prosperity of the United States, are historically unknown. Yet it is through the accumulative energies of its vast millions of workers that America is great in all its dimensions in comparison with other lands and governments. As one of our modern writers of history has said: "History is a record of man in conflict with circumstance. But men are of different breeds and different capacities. Hunger discourages one man and inspires another. A tyrant lays his whip across the backs of one set of men and they take it meekly, while another set of men pull him down from his horse and chop off his head." It is the American tradition to overcome obstacles through vigorous action. Despite the propaganda emanating from writers, commentators and critics presenting inferiority complexes and negative viewpoints, on the part the United States is and will continue to play in the world conflict, the vigorous American tradition or fighting spirit is still in existence. We may feel confident it will bring victory in the war as it has brought such substantial results in industry.

An excellent advocacy of a positive war psychology was made by Eric A. Johnston, president of the Chamber of Commerce of the United States, in the Atlantic Report on America's Future, published in the November, 1942 issue of *The Atlantic Monthly*. Mr. Johnston said in part: "The confusion attendant upon setting up a great war machine has brought us vexatious problems. The country has heard many discouraging statements. Among other things, it has heard that facts about our production are 'sugar coated'; that American aircraft are inferior to enemy aircraft; that our fighting men are improperly equipped; that the administration of the war effort is hopelessly and irretrievably out of gear; that the average person is failing to do his part in the war effort. We have heard, in short, that we are losing the war on production and battle fronts. What is the purpose behind negative and discouraging propaganda? The avowed intent is to awaken the American people to the dangers of total war, and to spur them to further effort on the home front. Let us analyze this objective sanely. Who in this country is not awake to the peril confronting our civilization? Strangely, it is always the other fellow who does not have a total awareness of this total war. I submit that the American people—businessmen, workers, farmers—know we are at war with ruthless and powerful enemies whose design is to enslave us . . . Let us not make the dreadful mistake of underrating our might . . . We are the people who brought this age of mechanics to its present high pitch, and we can wage mechanical war. As a technician in one of our great war plants said, when asked if he could construct an intricate item of war equipment, 'Why not? It's a machine, isn't it?'."

Advising all to examine the facts, Mr. Johnston said: "If I held before you a chart indicating the rise in American war production since Pearl Harbor, you would see a line rising steadily at an angle of 45 degrees. Of course, we do not consider our production good enough. It will never be good enough until winning the war is assured . . . What are the facts about our planes? The facts show that we have been winning air battles at a conservative ratio of three to one . . . Our great construction industry deserves special commendation . . . The automobile industry alone more than matches the output of our enemies in the production of many war items. I need only mention the remarkable performance of our shipbuilding industry . . . The people who win wars are motivated by a positive psychology, which springs from confidence in the nation's strength and will to win . . . The national psychology of the French was negative. The American people can face the facts of this war. But they do not want unjustified criticism of their efforts and unwarranted pessimism designed for the good of their morale. The American people do not have to be told what they are not doing; they want to be told what to do, and they will do it . . . We need a positive national psychology for victory. That inspiration can come only from our country's leaders. We must all talk victory, think victory, and act victory. We must know that we shall overwhelm, smash, devastate the enemy."

Looking ahead, Mr. Johnston said: "But in spite of the accomplishments of this economic system, there are people who say that this war will end capitalism in

the world. Is this the future of our great, progressive, forward-looking country? It is not my future. It is not the future of the United States. For our country is not ripe to be 'pensioned off', now or after the war . . . Every index of economic growth in democracies shows a steady and predictable rate of advance which has only slightly and temporarily been disturbed, even by war and depression. The people of our country want to continue that growth . . . We are perfectly willing to endure the hardships and regimentation of war. But after this war is over, any politician who attempts to impose regimentation upon our people will be quickly removed from office. We shall want the freedoms of democracy promptly restored after this war . . . The millions in uniform and the men and women left behind have the votes to control any future election. And they are going to judge all issues and movements in terms of the shortest possible ending of the war with complete victory."

## Collects 600,000 Tons of Waste Paper

Government efforts to make the British people salvage-minded by pointing out the huge savings in ship tonnage possible through the saving of waste have been most successful with regard to paper, according to a report to the Department of Commerce. In a period of a little more than two years more than 600,000 tons of waste paper have been collected in the United Kingdom. To bring in an equivalent amount of paper would have required 116 good-sized ships, which thus were left free to transport instead foodstuffs and munitions.

## Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

| Current Weeks—1942 | | Corresponding Weeks—1941 | |
|---|---|---|---|
| October 3 | 87.9 | October 4 | 103.6 |
| October 10 | 88.6 | October 11 | 102.1 |
| October 17 | 89.6 | October 18 | 105.5 |
| October 24 | 89.9 | October 25 | 106.4 |
| October 31 | 92.9 | November 1 | 108.6 |
| November 7....(Prelim.) | 89.9 | November 8 | 105.0 |

COMPARATIVE MONTHLY SUMMARIES

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July |
|---|---|---|---|---|---|---|---|
| 1941 | 85.6 | 89.7 | 92.2 | 96.0 | 98.7 | 99.3 | 94.2 |
| 1942 | 104.5 | 103.9 | 102.9 | 100.4 | 95.3 | 87.3 | 75.8 |

| Year | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|
| 1941 | 101.0 | 99.7 | 105.2 | 106.2 | 100.4 | 97.4 |
| 1942 | 80.8 | 82.9 | 90.5 | ... | ... | ... |

COMPARATIVE YEARLY SUMMARIES

| | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 |
|---|---|---|---|---|---|---|---|---|
| Year to Date | 69.4 | 79.3 | 84.2 | 70.9 | 81.6 | 86.1 | 96.4 | 91.9 |
| Year Average | 69.9 | 80.4 | 79.8 | 71.5 | 83.4 | 85.6 | 97.4 | ... |

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1937 | 83 | 89 | 89 | 91 | 88 | 80 | 69 | 77 | 72 | 70 | 57 | 47 | 75 |
| 1938 | 56 | 63 | 63 | 60 | 60 | 59 | 59 | 60 | 70 | 73 | 67 | 61 | 64 |
| 1939 | 65 | 73 | 76 | 74 | 69 | 73 | 68 | 77 | 82 | 91 | 88 | 77 | 77 |
| 1940 | 78 | 75 | 74 | 76 | 82 | 85 | 77 | 79 | 78 | 85 | 82 | 77 | 78 |
| 1941 | 81 | 88 | 89 | 89 | 91 | 94 | 92 | 98 | 95 | 99 | 98 | 90 | 92 |
| 1942 | 102 | 101 | 101 | 95 | 82 | 72 | 68 | 75 | 76 | 81 | .. | .. | .. |

Week ending Oct. 3, 1942—80
Week ending Oct. 10, 1942—80
Week ending Oct. 17, 1942—79
Week ending Oct. 24, 1942—81
Week ending Oct. 31, 1942—84
Week ending Nov. 7, 1942—84

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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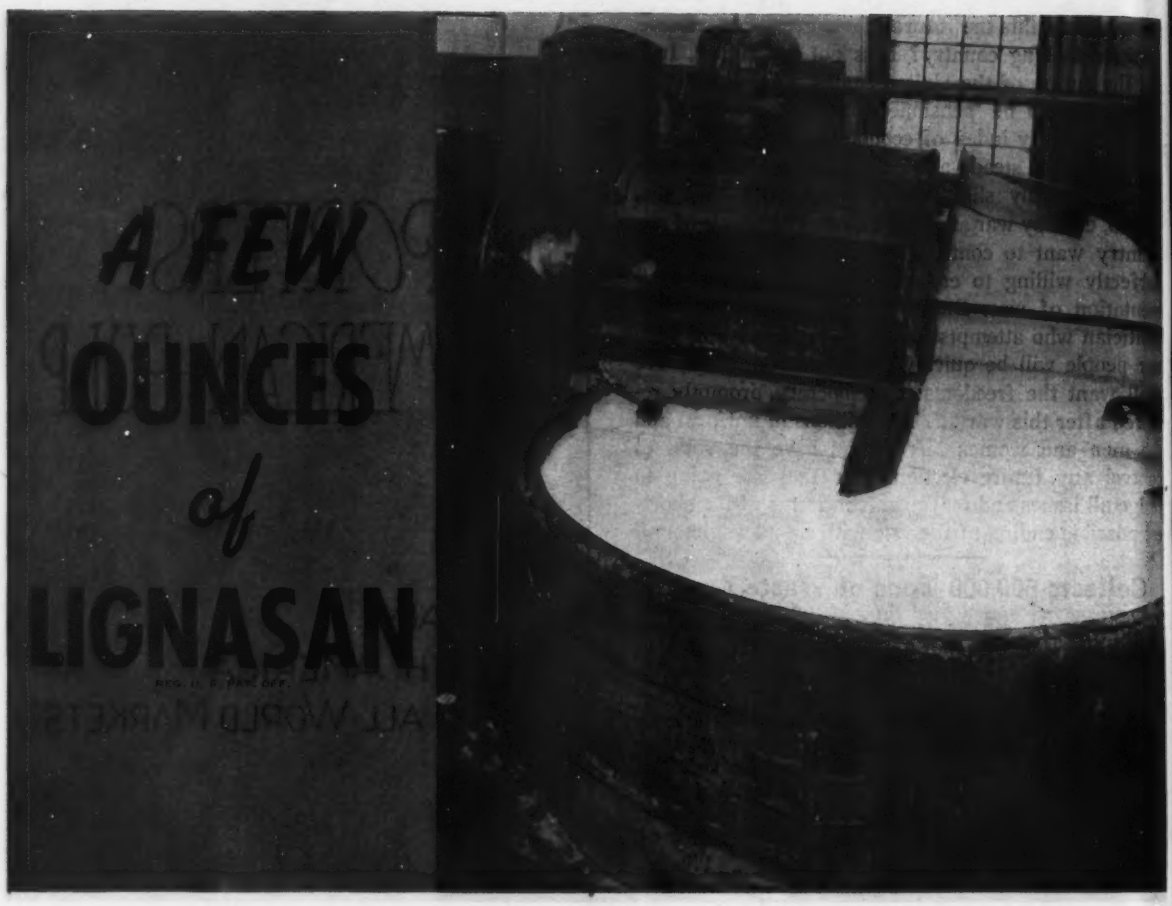


# ... control slime economically

A handy and inexpensive practice adopted by many paper mill operators using "Lignasan" is to put 3 to 5 ounces of it in an ordinary paper bag and toss into the beater. This small amount is usually ample to control slime in beater chests, in machine storage chests, in the machine head boxes, on screens and machine wires and in the connecting pipes all the way from the beaters to the paper machine.

Some operators prefer to bleed a water solution of "Lignasan" into the system at the point where various kinds of pulp are mixed or add it with the stock as it enters the machine storage chest. In some instances, it is being added at the white water well.

**PULP PRESERVATION**

To preserve laps or rolls or slush pulp, "Lignasan" is used in a range of from 4 ounces to 8 ounces per ton of fiber, dry basis. Laps usually are treated by means of a simple perforated pipe applicator, suspended above the wet machine, with a control valve in the pipe connecting it with a supply of "Lignasan" solution contained in an ordinary 50-gallon drum or barrel. The solution is fed at a rate to give the desired dosage.

To preserve slush pulp against deterioration by bacteria or fungi, the "Lignasan" is mixed thoroughly with the stock, using a slug dose of 4 ounces to 6 ounces per ton of fiber, dry basis.

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.

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*BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY*

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
Edited by R. G. Macdonald, Secretary

# Bleaching Rag Stock with Chlorite Activated by Hypochlorite*

By J. E. Brennan[1], J. D. MacMahon[1], and G. P. Vincent[2]

**Abstract**

*Sodium chlorite is being applied to bleaching operations in rag-paper mills by the washer and the drainer methods. The physical tests show an improvement in quality, and the chloride content of the pulp and the paper is considerably reduced.*

Prior to the development of chemical wood pulp in the paper industry rags constituted the main source of fiber for making paper of all types from news to document. The Chinese were the first to practice the art of making paper from rags and used essentially the same procedure followed today in the preparation of hand made paper. Although the Chinese were believed to have been making this type of paper at the dawn of the Christian era, so called western civilization was slow to acquire this basic index of progress and it was not until 1690 that commercial paper making was first put into operation in this country.

Due to inefficient pretreatments and a lack of suitable refining equipment early rag paper making methods required an extreme degree of degradation of the cellulose in order to form a satisfactory sheet. This resulted in a paper much inferior in strength and permanency to present day rag paper which is considered to be the highest quality paper now produced where permanency and durability are required. The introduction of the hollander beater during the latter part of the eighteenth century constituted one of the outstanding advances in the art of quality paper making in that its effective mechanical action refined the rag stock without resorting to extreme degradation through biochemical action on the cellulose.

The disuse of fermentation plus improvements in chemical cooking to prepare the rags for the beating operation further improved the quality of rag paper. A chemical treatment was initially confined to an alkaline cooking step but this was later supplemented by a bleaching stage using a solution prepared from bleaching powder. These two operations had the essential purpose of imparting a more attractive appearance as well as improving the sheet making characteristics. The cooking operations have been modified through research and experience so that today a wide variety of cotton materials can usually be prepared with very little adverse effect on the cellulose. However, subsequent bleaching has not been developed to the point where a clean stock can be produced without suffering some degree of cellulose degradation.

The inherent tendency of hypochlorite to strenuously attack cellulose usually defies all efforts to prevent undue degradation despite careful control of such influencing factors as pH, temperature, concentration of the bleaching agent and contact time either in the washer or drainer. This basic problem stimulated a recent development in which the bleaching agent consists of a mixture of hypochlorite and chlorite. This solution entirely replaces hypochlorite but otherwise does not involve any changes in present mill practices.

The bleaching action of this mixture is determined by the fact that the hypochlorite constituent selectively reacts with the chlorite present to activate the latter so causing it to bleach the stock to as high a brightness but with less degradation than where hypochlorite is used alone. Although the mechanics of the reaction between chlorite and hypochlorite are not entirely understood, the observation that chlorine dioxide is evolved from the reaction suggests that this primary end product contributes largely to the bleaching effect. The rate of reaction between chlorite and hypochlorite increases with a decrease in pH. The rate of reaction that best complies with the requirements for rag bleaching occurs between pH 8.5 and 9.5. Advantage is taken of the inability of chlorite and hypochlorite to react at high pH values to prepare stable stock solutions of the mixture in the optimum proportions required for bleaching. The sodium chlorite in flaked form now being used by paper mills under the commercial trade name "*C2*" will readily dissolve in a sodium hypochlorite liquor. It does however, dissolve with difficulty in a calcium hypochlorite solution due to the conversion of the sodium chlorite to calcium chlorite which has a slower rate of solubility. Here it is advisable to dissolve the "*C2*" in water before adding it to the calcium hypochlorite.

Sodium chlorite is being applied to the bleaching operation in several well known New England rag paper mills by two methods. These are exemplified by the procedure in the following two mills.

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Statler, Boston, Mass., Sept. 29-Oct. 1, 1942.

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### Mill A—Washer Bleaching

PREPARATION OF STOCK SOLUTION

A sodium hypochlorite solution is prepared by chlorinating a batch of about 1300 gallons containing 225 pounds sodium hydroxide and 100 pounds sodium carbonate. The entire content of a 150-pound cylinder of chlorine is used for this batch. This liquor contains about 14 grams per liter available chlorine. The entire content of a 100-pound drum of "C2" is then added to the batch which is stirred until the C2 is dissolved. This increases the available chlorine content of the batch to about 26 grams per liter which then contains approximately equal proportions of available chlorine as hypochlorite and as chlorite. The mixed stock solution so prepared is stable over a period of several days.

BLEACHING PROCEDURE

After the cooked rags are washed in the usual manner, alum is first added to the washer in such an amount that the pH in the washer is between 8.5-9.5 after the required amount of bleach has been added. The bleaching operation is then conducted in a manner similar to the usual hypochlorite bleach. The stock is completely bleached in the washer using the same amount of time previously required for hypochlorite. As was the case with hypochlorite no heat is applied. The hypochlorite-chlorite mixture, however, requires less available chlorine than hypochlorite to bleach the stock to the same degree of brightness. It was determined that equivalent brightness is obtained by using 50% of the amount of available chlorine previously used as hypochlorite. Since nearly half of the available chlorine content of the mixture is in the form of chlorite this mill was thus able to reduce their consumption of liquid chlorine to about 25% of the usual demand.

### Mill B—Drainer Bleaching

In this mill the chlorite-hypochlorite activation is being successfully applied to drainer bleaching. Where this method is practiced approximately the same proportions of available chlorine as chlorite and hypochlorite are used as that applying to bleaching in the washer. The same pH range (8.5-9.5) is also maintained and the stock is dumped to the drainers without washing or further chemical addition. Where prolonged retention of the half stock in the drainer is necessary to produce a satisfactory bleach on highly resistant colored rags, the chlorite-hypochlorite bleach possesses a distinct advantage over hypochlorite alone by protecting the stock against excessive degradation.

BLEACHING PROCEDURE

In this mill the preparation of a mixed stock solution is not attempted due to the use of calcium hypochlorite made by chlorinating a milk of lime suspension. Instead, the C2 is first added to the washer followed by the required amount of calcium hypochlorite to give approximately equal proportions of available chlorine in the form of each of the oxidizing agents. Here, the total available chlorine per unit weight of stock is the same as that regularly used. A pH of 8.5-9.0 exists without adjustment during the one-hour retention period in the washer. The stock is then dumped to the drainers where bleaching develops during the usual retention time.

When bleaching lower grades of rags in this manner, the stock may have an inferior appearance as it is being dropped to the drainers. However, during the usual retention time in the drainer a color develops which is superior to that obtained from hypochlorite alone.

### Mill Performance

The following summarizes the improvements in quality and advantages in operation reported by several mills who have adopted the activation process:

1. Viscosities are actually increased over that of the cooked rags and individual values are unusually uniform.
2. Copper numbers are reduced to about 50% of the values resulting from the use of hypochlorite alone.
3. The alpha-cellulose content is higher than that of hypochlorite bleached rags.
4. The physical tests on the finished paper show an increase in quality as represented by burst, tear, fold, formation, color, sizing, and ash.
5. The chloride content in both the pulp and the finished paper is considerably reduced. This fact suggests that the demand on the washers can be reduced, saving water, power and time.
6. There is also the benefit derived from the conservation of liquid chlorine which is of great importance to the war effort.

Paper made from rags has long held a preeminent place in the field of quality papers. It has always been the aim of the rag-paper mills to seek process improvements which tend to strengthen this position. A change in the general quality of the supply of rags now available for this use makes it increasingly more difficult to maintain rag stock papers at a high quality level. It is believed that the chlorite-hypochlorite activation method of bleaching here described is a definite contribution to the efforts of the rag paper operator not only to solve some of his existing problems but also to establish a new and higher standard of quality.

### Acknowledgement

The writers wish to acknowledge their indebtedness to Bjarne Johnsen, John L. Parsons, and Donald T. Jackson of the Hammermill Paper Company, for the original work performed by them in developing this general bleaching procedure.

## Wilderness Survival Course

Dean Samuel N. Spring of the New York State College of Forestry, Syracuse University, announces a new course of lectures and field trips teaching resourcefulness when traveling in rough country, survival in the wilderness and physical fitness. This course is for men students and will begin January 12 under the joint direction of the College of Forestry and the Department of Physical Education of the University.

Experts at the Forestry College believe that the average man entering the Armed Services is lacking in the knowledge of and the use of many aids that will help him to survive and travel through forested or wild country. Often he has had no training in the use of the axe or other woods tools used in constructing shelters, log bridges and tank traps. "Letters from alumni in the Army show the value of mapping and woods skills. The new course will give this instruction to students who may soon be in urgent need of such training," says the Dean.

## Joins New Haven Co.

Charles M. Mead, formerly with S. Austin Bicking as assistant general manager, has joined the staff of the New Haven Pulp and Board Company.

In addition to his duties at the New Haven home office he will be available at the sales office of the company in the Graybar Building, New York, a portion of the time.

# The pH Factor in the Hypochlorite Bleaching of Woodpulp

## Part I A. Single-Stage Treatment of Sulphite Pulp

By Ferri Casciani[1] and Gordon K. Storin[2]


### Abstract

*To supplement the work described in the earlier report on this same subject, the pulp was again bleached to a constant brightness at varying final pH values, but the brightness in this case was 82 as compared with 74 in the earlier work. Data are presented regarding the effect of final pH on the chlorine requirement, on bleaching time, and on such pulp properties as bursting strength and tearing resistance, beating time, loss on fading, ash content, and alpha-cellulose content.*


### Introduction

In the first report on the subject of the pH factor in the single-stage bleaching of sulphite pulp *(1)*, among the groups of experiments described was one which consisted of bleaching the pulp to a constant brightness value of 74 at varying final pH values. A study was made of the effect of final pH on chlorine requirement, on bleaching time, and on certain physical and chemical properties of the pulp. In view of the fact that, at this particular brightness value, the effect of pH on some of the pulp properties was not very marked, it was felt that important additional information might be obtained by repeating the work at a higher brightness.

Accordingly a new group of experiments was performed in which all samples were bleached to an 82 brightness. The experiments were all carried out under the same conditions and on the same lot of air-dry west coast sulphite pulp used in our previous work.

The factors held constant in all tests were pulp consistency, temperature, residual chlorine, and brightness after bleaching (Table IX). Final pH values ranging from 3.0 to 9.5 (Fig. 13) were obtained by the addition of varying amounts of either HCl or NaOH before the addition of the calcium hypochlorite solution to the pulp. At the same time, the amount of available chlorine employed was adjusted so that the same brightness was obtained in all tests. Obviously, to obtain these results it was necessary to employ trial and error methods.

A calcium hypochlorite solution, prepared from fresh bleaching powder and testing about 35 grams of available chlorine per liter, was employed in all

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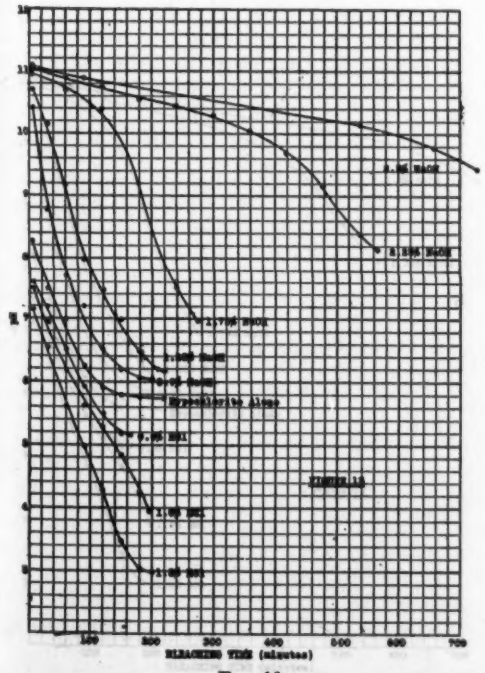

FIG. 13

Variation in pH during Bleaching in Bleaching to a Constant Brightness with the Addition of Varying Amounts of NaOH or HCl. Constants: Air-Dry Pulp Consistency, 6%; Temperature, 104 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 81.7-82.0.

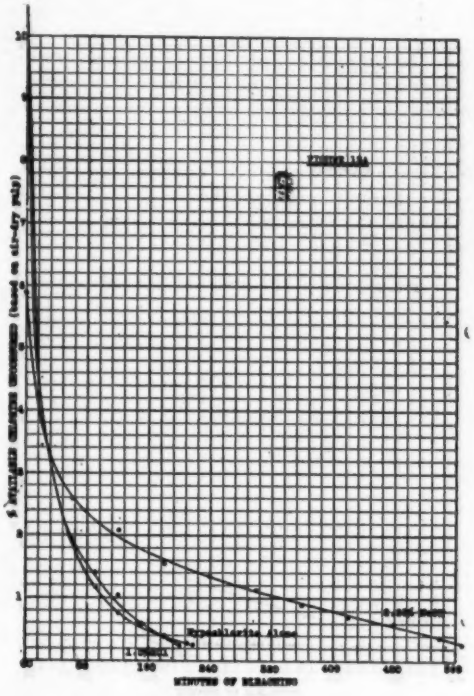

FIG. 13A

Effect of the Addition of HCl or NaOH on the Rate of Consumption of Available Chlorine in Bleaching to a Constant Brightness. Constants: Air-Dry Pulp Consistency, 6%; Temperature, 104 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 81.7-82.0.

TABLE IX.—BLEACHING TO A CONSTANT BRIGHTNESS AT A VARYING FINAL pH

Constants:

| | |
|---|---|
| Air-dry pulp consistency | 6% |
| Temperature | 104° F. |
| Residual chlorine | 0.25% |
| Brightness after bleaching | 81.7-82.0 |

| Test | % NaOH or HCl Added | % Available Chlorine Added | Time, min. | Final pH | Brightness Obtained |
|---|---|---|---|---|---|
| 108A | 1.50% HCl | 11.10 | 200 | 2.99 | 81.8 |
| 105A | 1.00% HCl | 10.20 | 196 | 3.95 | 81.9 |
| 122B | 0.85% HCl | 9.10 | 170 | 4.28 | 81.9 |
| 127 | 0.75% HCl | 8.60 | 170 | 4.85 | 82.0 |
| 120A | 0.60% HCl | 8.70 | 165 | 5.17 | 81.9 |
| 119B | 0.40% HCl | 8.85 | 180 | 5.60 | 82.0 |
| 126B | none | 9.15 | 218 | 5.75 | 81.9 |
| 112B | 0.50% NaOH | 9.00 | 230 | 5.89 | 82.0 |
| 113B | 0.90% NaOH | 8.50 | 200 | 6.06 | 82.0 |
| 105B | 1.25% NaOH | 8.10 | 220 | 6.18 | 81.8 |
| 123 | 1.75% NaOH | 6.70 | 275 | 6.97 | 81.7 |
| 126A | 2.25% NaOH | 5.90 | 570 | 8.15 | 81.8 |
| 202A | 2.50% NaOH | 6.20 | 730 | 9.45 | 81.9 |
| 124° F. Trial: | | | | | |
| 202B | 2.25% NaOH | 5.90 | 245 | 8.91 | 80.3 |

tests. The alkalinity of this solution was kept uniform (about 1.3 grams of calcium hydroxide per liter) by stirring in hydrated lime and permitting the excess lime to settle out before drawing off clear liquor for use in the tests.

### Effect of Acid and Alkali on pH

When hypochlorite alone was added to the pulp, the pH dropped rapidly from an initial value of about 8.3 to a final value of 5.75. When caustic soda was added in amounts varying from 0.5 to 2.5%, the initial pH was in the range of 9.9 to 11.1. The final pH, however, increased gradually with the amount of caustic soda added to give values ranging from 5.9 to 9.45.

The addition of hydrochloric acid in amounts varying from 0.4 to 1.5% gave initial pH values from 7.85 to 7.15. At the same time, the final pH dropped rapidly to give values ranging from 5.6 to 3.0.

In all these tests it was observed that the pink color

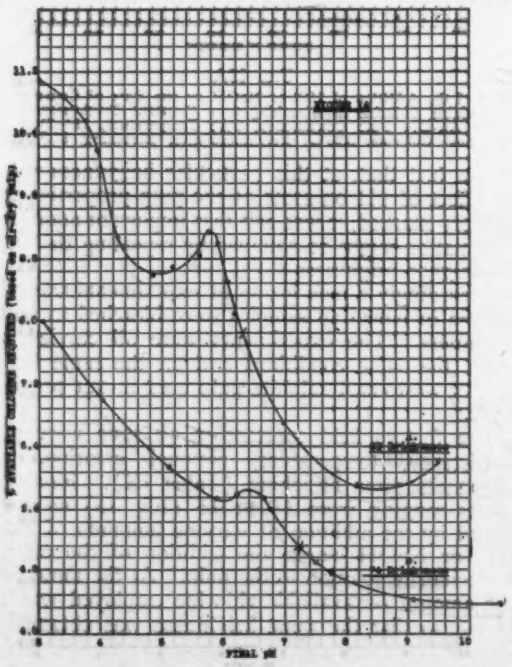

FIG. 14

Variation in the Amount of Available Chlorine Required in Bleaching to a Constant Brightness at Varying Final pH Values. Constants: A—Air-Dry Pulp Consistency, 6%; Temperature, 104 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 81.7-82.0. B—Air-Dry Pulp Consistency, 6%; Temperature, 91 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 74.2-74.4.

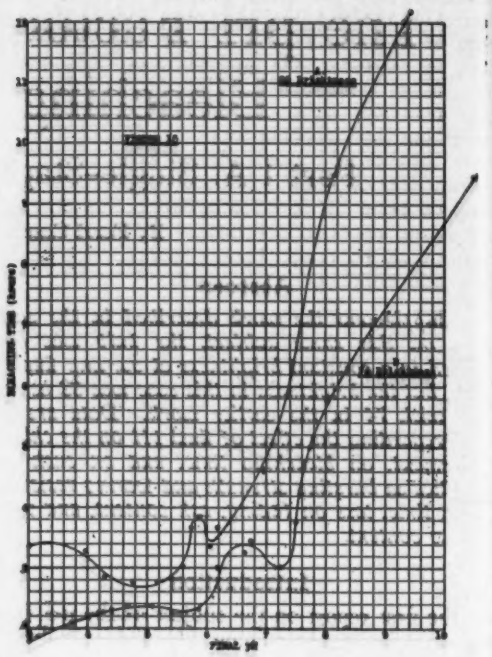

FIG. 15

Variation in Bleaching Time in Bleaching to a Constant Brightness at Varying Final pH Values. Constants: A—Air-Dry Pulp Consistency, 6%; Temperature 104 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 81.7-82.0. B—Air-Dry Pulp Consistency, 6%; Temperature, 91 Deg. F.; Residual Chlorine, 0.25%; Brightness after Bleaching, 74.2-74.4.

reaction with phenolphthalein indicator persisted down to a pH of about 6.8. Even in the test in which 1.5% HCl was used, the initial color reaction was pink.

### Effect of Final pH on Chlorine Requirement

The effect of varying the final pH value on the chlorine requirement is shown in Fig. 14 and in Table IX. For ease of comparison, the curve for 74 brightness has been reproduced along with the 82 brightness curve. It will be observed that while the curves are similar in shape, the trends are much more pronounced at the higher brightness. In general, in both cases, there was a marked decrease in chlorine requirement as the final pH was increased. At the 74 brightness, the chlorine requirement appeared to reach a minimum of 4.35%. At the higher brightness, however, the requirement dropped to 5.9% at a final pH of about 8.5, beyond which more available chlorine was again required to obtain the same brightness.

The exception to the general trend, which had been noted in the earlier work at the 74 brightness and which showed up as a hump in approximately the center of the curve, was found to be even more pronounced in the 82 brightness curve. The peak of the hump in both cases occurred at the point where hypochlorite alone had been added to the pulp. As the pulp was acidified, there was a reduction in the chlorine requirement which was quite substantial at the 82 brightness. The steep upward trend was then again resumed as the pH dropped still further. The excessive consumption of chlorine at the low pH values is undoubtedly due to the chlorination of lignin which in single-stage bleaching may be considered an undesirable side-reaction.

The X mark on each of the two curves denotes the

maximum final pH which could be employed without increasing the bleaching time over and above the time required when no alkali was used. At the 82 brightness, by increasing the final pH from 5.75 to 6.3 by the use of about 1.4% of NaOH, the chlorine requirement was reduced from 9.15 to 7.9% without increasing the bleaching time. At the 74 brightness, when the final pH was increased from 6.2 to 7.25 by the use of 0.75% of NaOH, the chlorine requirement dropped from 5.8 to 5.1%. The use of still higher pH values resulted in a further decrease in chlorine requirement but under these conditions the bleaching time was lengthened.

### Effect of Final pH on Bleaching Time

The comparative rates of consumption of available chlorine under widely varying pH conditions are shown in Fig. 13A. The results here were very much the same as those shown in Fig. 7 *(1)*. These curves are characterized by a rapid consumption of available chlorine at the start of the reaction. In the alkaline bleach, the rate of reaction dropped off considerably after about one hour to give a bleaching time of 9½ hours.

Figure 15 shows the effect of final pH on the bleaching time. The tests at 74 brightness were run at 91 deg. F., those at 82 brightness were run at 104 deg. F. In the former case, the bleaching time increased very rapidly as the final pH rose above 7.4; at the higher brightness, the rapid increase in bleaching time began as the final pH rose above 6.4.

The bleaching time increased somewhat in the range corresponding to the hump in the chlorine requirement curve. In bleaching to an 82 brightness, when sufficient acid was added to drive the final pH down to about 5, the bleaching time was shortened by 25%. In bleaching to a 74 brightness, the time was also shortened by 25% when the final pH fell below 6. Additional acidification at the lower brightness shortened the time still further, but at the higher brightness the time increased somewhat as the final pH dropped below about 4.5.

Test 126A (Table IX) which had a bleaching time of 9½ hours at 104 deg. F., was repeated at a temperature of 124 deg. F. (Test 202B). By so doing, the bleaching time was reduced to about 4 hours but the brightness obtained with the same amount of available chlorine dropped from 81.8 to 80.3. A similar effect had been observed in our earlier work at 74 brightness.

### Effect of Final pH on Pulp Strength

The curves in Fig. 16 show the effect of final pH on the strength and beating properties of the pulp at

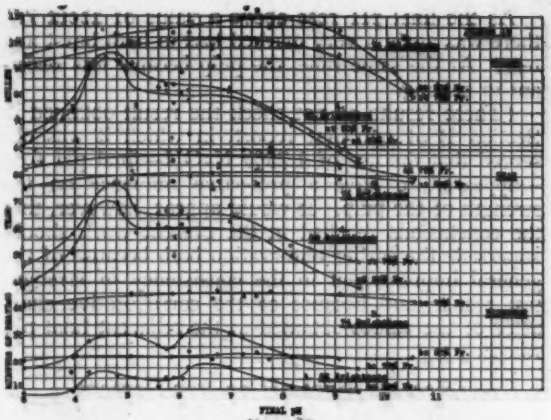

FIG. 16

Strength and Beating Characteristics of the Pulp When Bleached to a Constant Brightness at Varying Final pH Values.

both 74 and 82 brightness and at both 75% and 50% freeness. The data which go to make up the 82 brightness curves are listed in Table X. As pointed out in our first report, the results obtained in the 74 brightness group were none too consistent. It was felt that this may have been due to the widely varying periods of storage between the bleaching and the strength testing of the pulps. In carrying out the work at the 82 brightness, this time of storage was kept quite constant and the results proved to be more consistent.

It is obvious from these results that the extent to which the fiber was damaged depended first of all on the brightness to which the pulp was bleached. At the 74 brightness there appeared to be little attack on the fiber. The strength of the pulp appeared to remain quite uniform throughout a wide range of final pH values. There was, however, a definite tendency toward lower strength as both the lowest and highest final pH figures were approached.

When the pulp was bleached to a brightness of 82, the effect was quite different. Here we find that the strength was well preserved only in the final pH range of about 4.25 to 5.0. As the final pH dropped below 4.25, there was a marked loss in both Mullen and tear and a decreased resistance to beating.

In the final pH range of 5.25 to approximately 7.0 the strength appeared to remain about constant. In this range the burst (Mullen) was about 20% lower and the tear about 25% lower than the corresponding values at 74 brightness. The beating time, however, did not remain constant. The use of alkali in small amounts increased the beating time by as much as 30%.

TABLE X.—EFFECT ON PULP QUALITY OF BLEACHING TO A CONSTANT BRIGHTNESS AT A VARYING FINAL pH

| Test | Loss on Fading | % Alpha-Cellulose | % Ash | Beating Time to 75% Freeness | Beating Time to 50% Freeness | Burst at 75% Freeness | Burst at 50% Freeness | Tear at 75% Freeness | Tear at 50% Freeness |
|---|---|---|---|---|---|---|---|---|---|
| 108A | 4.0 | 68.44 | .27 | 8 | 18 | 61 | 64 | 46 | 38 |
| 105A | 5.1 | 74.77 | .21 | 9 | 22 | 74 | 76 | 58 | 51 |
| 122B | 4.9 | 80.07 | .30 | 16 | 28 | 90 | 92 | 68 | 67 |
| 127 | 5.2 | 81.75 | .26 | 15 | 30 | 93 | 96 | 77 | 70 |
| 120A | 5.1 | 81.85 | .34 | 14 | 30 | 76 | 90 | 67 | 59 |
| 119B | 5.0 | 81.74 | .33 | 11 | 26 | 83 | 83 | 66 | 62 |
| 126B | 5.0 | 81.84 | .41 | 14 | 25 | 82 | 84 | 67 | 61 |
| 112B | 5.4 | 81.87 | .45 | 14 | 26 | 77 | 84 | 57 | 50 |
| 113B | 5.8 | 82.52 | .52 | 14 | 30 | 81 | 89 | 67 | 62 |
| 105B | 6.2 | 82.53 | .66 | 18 | 32 | 78 | 82 | 64 | 59 |
| 123 | 6.6 | 83.50 | .72 | 18 | 31 | 82 | 83 | 69 | 63 |
| 126A | 6.4 | 83.81 | .90 | 11 | 22 | 69 | 71 | 64 | 50 |
| 202A | 4.9 | 83.52 | .98 | 9 | 18 | 54 | 56 | 48 | 38 |
| 124° F. Trial: | | | | | | | | | |
| 202B | 5.4 | 83.61 | .76 | 11 | 23 | 70 | 70 | 61 | 52 |
| Unbleached | 2.8 | .... | .46 | 22 | 47 | 98 | 109 | 112 | 104 |

As the final pH rose above a value of about 7.0, there was again a very marked loss in both burst and tear. At the same time, the pulp became less resistant to beating.

(These results do not check the result obtained in Section B of our first report, in which it was observed that the use of 1.25% NaOH—final pH 6.65—appeared to have a protective influence on the strength of the pulp. It would appear, however, that the conclusions reached in the present work should supersede the earlier observation both because of the general improvement in the consistency of strength test results and because of the corroborative character of the values obtained in the adjacent final pH ranges.)

### Effect of Final pH on Ash Content

The lowest ash content was obtained at the low pH values. Both at a 74 and at an 82 brightness, a minimum value of about 0.25% was reached at a final pH of 4.0 to 4.5 (Fig. 17). As alkali was added to the pulp, the ash content increased rapidly. At the lower brightness, the ash reached a maximum value of about 0.65% at pH 9.0 and over, while at 82 brightness the value rose more sharply to a figure of about 1.0% at pH 9.45.

### Effect of Final pH on Fading Properties

The results obtained at 82 brightness showed the same trend as those previously obtained at the lower brightness (Fig. 17). The most stable color was obtained in the range of low final pH values. The use of alkali in small amounts resulted in pulps which were appreciably less stable in color. As the higher pH values were approached, the stability of color improved again. In the final pH range 4.0 to 5.75 the loss on fading was about 25% less than in the range of 6.5 to 7.5.

After completing the work at 74 brightness, the fading test procedure was modified in certain respects, with the result that more satisfactory results were obtained in the work at 82 brightness although the values were somewhat lower. For this reason, the two curves shown in Fig. 17 are not directly comparable. Curve A should fall below curve B. However, the significant point is that both curves have a similar shape.

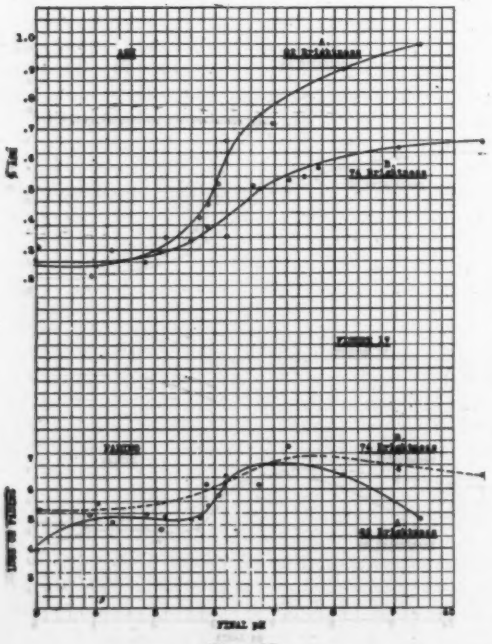

FIG. 17

Ash Content and Fading Characteristics of the Pulp when Bleached to a Constant Brightness at Varying Final pH Values.

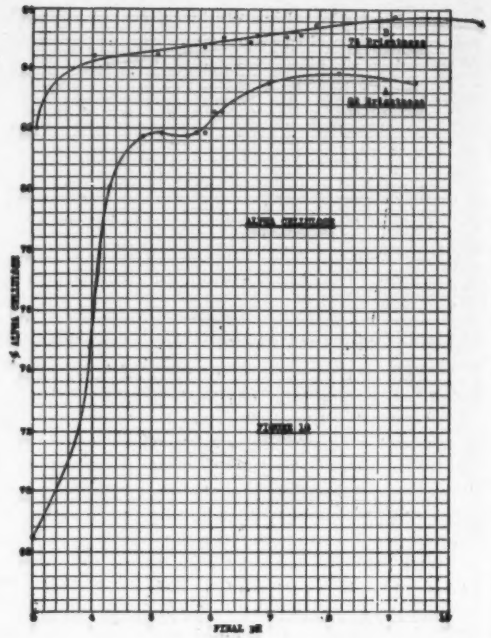

FIG. 18

Alpha Cellulose Content of the Pulp when Bleached to a Constant Brightness at Varying Final pH Values.

### Effect of Final pH on Alpha Cellulose Content

In general the alpha cellulose content was highest under alkaline conditions of bleaching (Fig. 18). In bleaching to an 82 brightness, the values obtained were lower than the corresponding ones at 74 brightness and the effect of variation in final pH was much more marked although similar in trend.

At the 74 brightness, the alpha content increased gradually from about 84.3% at a final pH of 4.0 to 85.7% at a final pH of 9.0. Bleaching at a still higher pH did not further improve the alpha content. As the final pH dropped below 4.0, the alpha cellulose content decreased quite rapidly to a value of 82.0% at a final pH of 3.0.

At the 82 brightness, a maximum alpha content of 83.8% was obtained at a final pH of 8.0. The use of a higher pH appeared to lower the value somewhat, probably due to the prolonged bleaching time. In the standard bleach using hypochlorite alone, the alpha content was 81.8% and this value remained constant when acid was added until the final pH dropped below about 5.0. The alpha content then fell off very sharply until at a final pH of 3.0, the value was 68.5%.

### Comparison of Bleaching Procedures

It is obvious from the above findings that it is possible, by proper adjustment of pH, to control to some degree certain physical and chemical properties of the pulp. To illustrate this point, three specific sets of pH conditions have been selected for purposes of

comparison. Data describing these three procedures and comparative properties of the resulting pulps are tabulated in Table XI. Column A represents the standard bleaching method in which hypochlorite alone was used. In the group of tests in which HCl was employed, the most desirable results from a practical standpoint were obtained when 0.75% HCl was used. This procedure is described in Column B. The procedure in C utilizes the maximum amount of NaOH which could be employed without increasing the bleaching time over and above the time required in A in which hypochlorite alone was used.

While B required 6% less and C 14% less available chlorine than A, it appears that the total chemical cost in each of three methods is about the same when the cost of HCl and NaOH required is taken into consideration.

However, Method B did appear to offer the following advantages over A:

(1) A 25% shorter bleaching time.
(2) Higher bursting and tearing strength (about 15% higher).
(3) Lower ash content (0.27% as compared with 0.42%). In some cases this may not be an advantage.

Alpha-cellulose content and loss on fading were about the same as in A, while the beating time required to reach a given freeness was somewhat longer.

Comparing Method C with A, the following points were noted:

(1) Higher alpha cellulose content (82.75% as compared with 81.8%).
(2) Higher ash content (0.65% as compared with 0.42%).
(3) Greater loss on fading (6.5 as compared with 5.1).
(4) Longer beating time to a given freeness.

There was no difference between C and A either in bleaching time or in the strength of the bleached pulp.

TABLE XI.—COMPARISON OF THREE BLEACHING PROCEDURES

Constants:

| | |
|---|---|
| Air-dry pulp consistency | 6% |
| Temperature | 104° F. |
| Residual chlorine | 0.25% |
| Brightness after bleaching | 81.7-82.0 |

| | A | B | C |
|---|---|---|---|
| Alkali or Acid Added | none | 0.75% HCl | 1.30% NaOH |
| Available Chlorine Required. | 9.15% | 8.60% | 7.90% |
| Initial pH | 8.3 | 7.4 | 10.8 |
| Final pH | 5.75 | 4.85 | 6.3 |
| **Bleaching time (minutes)** | **218** | **165** | **218** |
| Ash, % | 0.42 | 0.27 | 0.65 |
| Loss on Fading | 5.1 | 5.0 | 6.5 |
| Alpha-cellulose, % | 81.80 | 81.70 | 82.75 |
| Burst at 75% freeness | 80 | 93 | 80 |
| Burst at 50% freeness | 84 | 96 | 84 |
| Tear at 75% freeness | 66 | 77 | 66 |
| Tear at 50% freeness | 61 | 70 | 61 |
| Beating time to 75% freeness | 13 | 15 | 19 |
| Beating time to 50% freeness | 25 | 30 | 33 |

## Conclusions

In bleaching this particular air-dry west coast sulphite pulp with calcium hypochlorite solution by the single-stage method to a constant brightness of 81.7-82.0 employing a pulp consistency of 6% and a bleaching temperature of 104 deg. F., it was found that:

(1) Using calcium hypochlorite alone, the initial pH was about 8.3 and the final pH 5.75.

When caustic soda was added in amounts varying from 0.5 to 2.5% (based on the weight of air-dry pulp), the final pH ranged from 5.9 to 9.45 while the initial pH ranged from 9.9 to 11.1.

When hydrochloric acid was added in amounts varying from 0.4 to 1.5%, the final pH dropped to values ranging from 5.6 to 3.0 while the initial pH varied from 7.85 to 7.15.

(2) In all tests phenolphthalein indicator gave a pink color reaction at all pH values above approximately 6.7.

(3) Except in the final pH range of 5.0 to 5.8 and above 8.5, the chlorine requirement decreased as the final pH value increased. When hypochlorite alone was used, 9.15% available chlorine was required. When sufficient caustic soda was used to give a final pH of 8.5, the chlorine requirement dropped to a minimum of 5.9%. As the pH was increased still further, more available chlorine was again required to obtain the same brightness.

(4) When hydrochloric acid was used in an amount sufficient to lower the final pH to about 5.0, there was a reduction in chlorine requirement from 9.15 to 8.6%. As the final pH was lowered still further, the chlorine requirement again increased sharply.

(5) The bleaching time increased very rapidly as the final pH rose above 6.4. There was again a small increase in bleaching time in the pH range corresponding to the hump in the chlorine requirement curve. The use of HCl to lower the final pH to about 5.0 shortened the bleaching time by 25%. As the final pH dropped below about 4.5, the bleaching time increased somewhat, probably as a result of the sharp increase in chlorine requirement.

(6) When 2.25% NaOH was used, increasing the bleaching temperature from 104 to 124 deg. F. reduced the bleaching time from 9½ to 4 hours. However, using the same amount of available chlorine, the brightness dropped from 81.8 to 80.3.

(7) The strength values of the pulp were best preserved in the final pH range of about 4.25 to 5.0. As the final pH dropped below 4.25, there was a sharp decrease in the strength of the pulp. This same detrimental effect was observed as the final pH rose much above a value of 7.0. The use of caustic soda did not improve the strength of the pulp as evidenced by the uniform values obtained in the final pH range of 5.25 to 7.0.

(8) The beating time increased both as the final pH was increased to about 6.5 by the addition of NaOH and as it was lowered to 4.5-5.0 by the addition of HCl. Below 4.25 and above approximately 7.0, the beating time fell off rapidly as the strength of the pulp became adversely affected.

(9) Bleaching with hypochlorite alone gave an ash content of 0.42%. By lowering the final pH to 4.5 or below, a minimum ash content of about 0.25% was obtained. The use of NaOH resulted in a very rapid increase in ash content to a figure of about 1.0% at a final pH of 9.5.

(10) In the final pH range of 4.0 to 5.75 the loss on fading remained constant at about 5.0 points. The use of alkali resulted in an increase in fading which reached a maximum of 6.8 points at a final pH of about 7.0. The fading then decreased gradually as the final pH approached 9.5.

(11) Bleaching with hypochlorite alone gave an alpha cellulose content of 81.8%. This value remained constant down to a final pH of about 5.0. A further lowering of the final pH resulted in an extremely sharp drop in alpha content.

The addition of NaOH resulted in an improvement in alpha content up to a final pH of about 8.0. The alpha content at this point was 83.8%. As the final pH was increased still further, the alpha decreased slightly.

## Literature Cited

1. Casciani, F. and Storin, G. K. "A Study of the pH Factor in the Hypochlorite Bleaching of Woodpulp, Part I—Single-stage Treatment of Sulphite Pulp." Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 16-19, 1942.

# Pressure Drop Data as Applied to Pulp Suspensions

By James Cooper, Jr.[1]


## Abstract

*A method is presented for the calculation of an apparent viscosity from pipe flow head loss data of suspensions measured in small pipe sizes. This calculated viscosity may be correlated with percentage of solids, velocity and pipe size, and subsequently used for the calculation of head losses for other values of pipe size and percentage of solids than those employed in the original head loss measurements. For sulphite stock, this correlation is found to be*

$$\log \frac{0.095\, DC^3}{\mu} = 9.05\ U.$$

*The proposed method for dealing with the problem of suspension flow is compared with other methods reported in the literature.*


## Introduction

The problem of pumping a finely divided material in the form of a suspension through pipes is common to many industries. The prediction of the friction losses involved in any particular case and the specification of the necessary pumping equipment are based upon rule of thumb methods acquired through experience with the particular suspension in question. This situation is partly due to the relatively small amount of work done in studying the flow of suspensions but also is attributable to the difficulty of finding the correct method of approach to the problem. Its very nature admits of no easy solution, and no one simple mathematical expression should be expected to hold for all suspensions and all cases. But at least a generalized equation or equations ought to be found, with a wide enough application so that all data could be placed on a comparative basis similar to that for true liquids.

## Homogeneous and Nonhomogeneous Liquids

The difficulty of this problem lies primarily in the radical difference between a suspension and a Newtonian liquid with regard to one important property, that of homogeneity. A true liquid consists of infinitesmally small particles all free to move without any hindrance or friction between them. No true liquid actually exists, but those which are homogeneous—such as, water or solutions—exhibit the same amount of internal friction between particles at any one temperature, regardless of what physical force is exerted upon them or what their velocity may be. A suspension, on the other hand, is not homogeneous because it consists of at least two different particles radically different from each other in size, and it exhibits an internal frictional force opposed to motion which varies in magnitude with the relative motion of the particles and their relative number. This internal friction, in the case of Newtonian liquids, is termed viscosity, and can be determined with one comparatively simple measurement. The analogous property of suspensions has been called by various names but is now generally known as apparent viscosity. Attempts to measure this quantity have all met with the same difficulty. Its value depends entirely upon the nature of the suspension and upon conditions such as velocity, particle size, pH, amount of previous stirring, and other factors which have no effect in the case of a homogeneous liquid. A fluid flow problem involving a solution can be solved easily, because the viscosity is constant and can be measured quite simply. If the apparent viscosity of a suspension could be so determined the solution of the problem would be similar.

## Correlation of Viscometer and Pipe Flow Data

Wilhelm, Wroughton, and Loeffel *(9)* published data obtained with cement rock suspensions and Filter-Cel suspensions in which they compared viscometer measurements of apparent viscosity with actual pipe flow friction. A method of attack used by previous investigators was followed *(1, 4, 5, 6)*. The factors determining apparent viscosity were not investigated, although a correlation of viscometer measurements with pipe flow data was presented in the turbulent range of fluid flow—i.e., at quite high values of velocity in the size of pipe used. No correlation was found in the lower range of velocities although there was similarity in the trend of the two sets of data. Caldwell and Babbitt *(2)* performed similar experiments on clay and sewage sludges, obtaining a correlation in the turbulent range by assuming the suspension to have the same viscosity as that of the suspending medium. A correlation was obtained between viscometer data and pipe flow data in the viscous range by considering the net viscosity to be made up of two factors—pipe wall friction while in motion and an initial internal yield stress to be overcome before motion could be induced. Suitable treatment of data gave a relationship which permitted quite accurate calculation of friction head loss in pipe flow for the particular type of sludge used and over a rather short range of head loss for a given material.

## Principle of Dynamic Similarity

By the use of Buckingham's Pi theorem *(17)* and the theory of dimensional analysis it can be shown that all the variables involved in the flow of a fluid may be arranged in dimensionless groups as follows:

$$\frac{\Delta H D g}{2 L U^2} = F\left(\frac{DU\rho}{\mu}\right) \qquad (1)$$

This is generally known as the Fanning equation *(8)* and is usually shown on logarithmic coordinates as *f versus* Reynold's number where *f*, the Fanning friction factor, is equal to the left hand term of Equation 1. When the value of the Reynold's num-

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ber is 2100 or below, the flow is said to be streamline or viscous. When the value is greater than 2100, the flow may be turbulent. The standard friction factor-Reynold's number plot correlates all known data on the flow of Newtonian liquids with a maximum error of plus or minus 10%. No such correlation has been found to date for the flow of suspensions except in the turbulent range, where it has been shown *(2)* that for Reynold's numbers above 20,000 the same plot applies if the viscosity of the suspension is taken to be that of the suspending medium. This is a reasonable conclusion, because in this range the head loss is chiefly due to impact and kinetic energy effects.

However, in the range below Reynold's numbers of 20,000, no satisfactory method of treatment has existed because of the impossibility of determining the correct value to use for the viscosity. As was pointed out previously, this quantity is dependent on many other variables. It will be shown later that the apparent viscosity is even a function of pipe size, so that its measurement in a viscometer must fail for that reason alone, at least for the pulp suspensions under investigation.

The principle of *dynamic similarity (7)* states that if, in the flow of a fluid, the value of the dimensionless groups in one pipe system is equal to the value of the groups in any other pipe system, then the two systems are dynamically similar and the same conditions of flow exist. The pipe sizes, fluids, and velocities do not have to be the same. Attention has usually been focused on the Reynold's number as the criterion of dynamic similarity. If Equation 1 is examined it will be seen that the left hand member is an equally valid criterion of fluid flow. The same principle of dynamic similarity applies to it as to Reynold's number in the case of a Newtonian liquid. If the assumption is made that the laws governing the flow of suspensions are the same as those for liquids, and there are indications that this is so *(9)*, then Equation 1 should be the same function for suspensions. The value of the left hand term can be easily evaluated by means of pipe flow friction

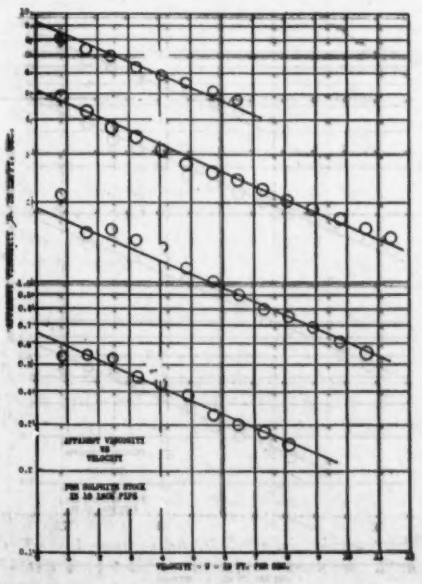

FIG. 1

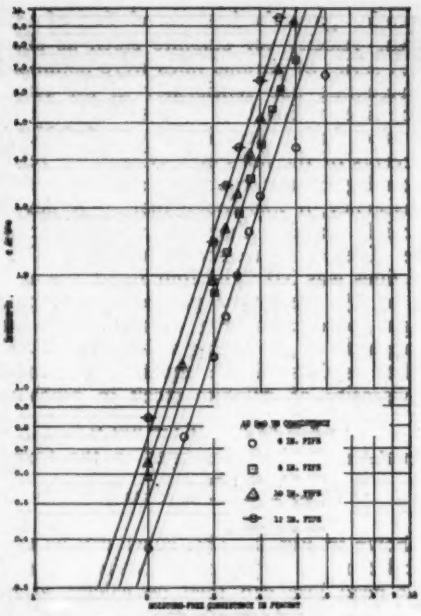

FIG. 2
Intercepts from Fig. 1

measurements. The corresponding value of the Reynold's number can then be taken from the standard plot of Equation 1, and the apparent viscosity calculated by means of this apparent Reynold's number. Then, with a series of measurements, a series of values for the apparent viscosity at those conditions of flow will be obtained. This is the actual apparent viscosity which the suspension would necessarily have to possess in order to give the same head loss as water or any other liquid at that apparent Reynold's number. This value of apparent viscosity would be independent of any of the errors involved in trying to measure it by other means. It is the viscosity displayed by the suspension under actual conditions obtaining in pipe flow.

By making a relatively small number of measurements on the particular suspension in question enough data could be obtained so that, by suitable treatment, it would permit the calculation of the actual apparent viscosity for any conditions of flow and any concentration of material. By using this calculated viscosity the head loss could then be calculated for any conditions of flow and concentration. The method outlined above is analogous to the application of Dühring's method *(8)* of extrapolation in the determination of various physical properties of liquids by referring them to water under the same conditions.

## Application of Method to Pulp Suspensions

The method outlined above was applied to the data of Forrest and Grierson *(3)* which were distributed to TAPPI members as TAPPI Data Sheets 22-A, B, C, and D. These gave the head loss per hundred feet of pipe against flow in gallons per minute for various consistencies of sulphite stock in four sizes of pipe. These data are generally known to give quite accurate results in practice. A sample calculation is shown for one case in the appendix.

The values of apparent viscosity, so obtained, comprising some two thousand results were plotted in various ways. It was found that a semilogarithmic

representation gave the best correlation of viscosity with linear velocity for sulphite stock as shown in Fig. 1. A series of parallel lines were obtained, each line representing one consistency in the same pipe size. The lines which best expressed all the data in all pipe sizes had a negative slope of 0.05. When the intercepts of the lines at a velocity of zero were plotted on logarithmic coordinates against moisture-free consistency, it was found that all values fell on four straight parallel lines, each representing one pipe size. These data are shown in Fig. 2. The slope of these lines was 3.0. The four intercepts at a consistency of 1% were then plotted against pipe size on straight coordinates (Fig. 3) and gave a straight line through the origin having a slope of 0.095. These three plots established the equation governing apparent viscosity of sulphite stock in pipes to be:

$$\log \mu = \log 0.095\ DC^3 - 0.05\ U \qquad (2)$$

This equation can be rearranged in the form:

$$\log \frac{0.095\ DC^3}{\mu} = 0.05\ U \qquad (3)$$

and is shown in Fig. 4. This curve can be used for the calculation of apparent viscosity. The corresponding head loss can then be calculated by the usual Fanning equation. A sample calculation for this is included in the appendix.

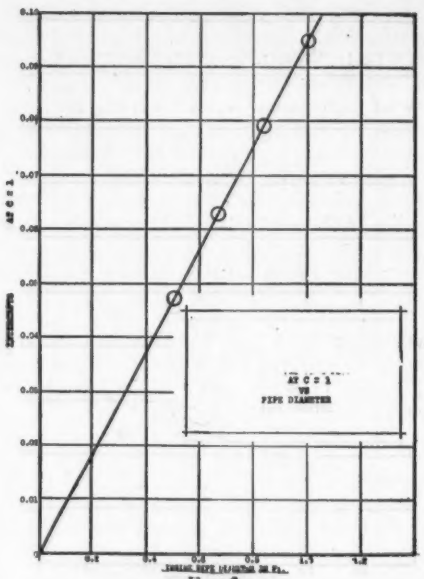

FIG. 3
Intercepts from Fig. 2

## Discussion of Results

All values of viscosity for sulphite stock are expressed by Equation 3 except for the following ranges. In the 6-inch pipe for the lower velocities and at consistencies above 3.75% the coefficient of velocity in Equations 2 and 3 is equal to 0.025. The consistencies which fall below or follow the head loss curve for water show marked deviations from any of the other data. Both these minor exceptions can be explained by types of flow. In the case of

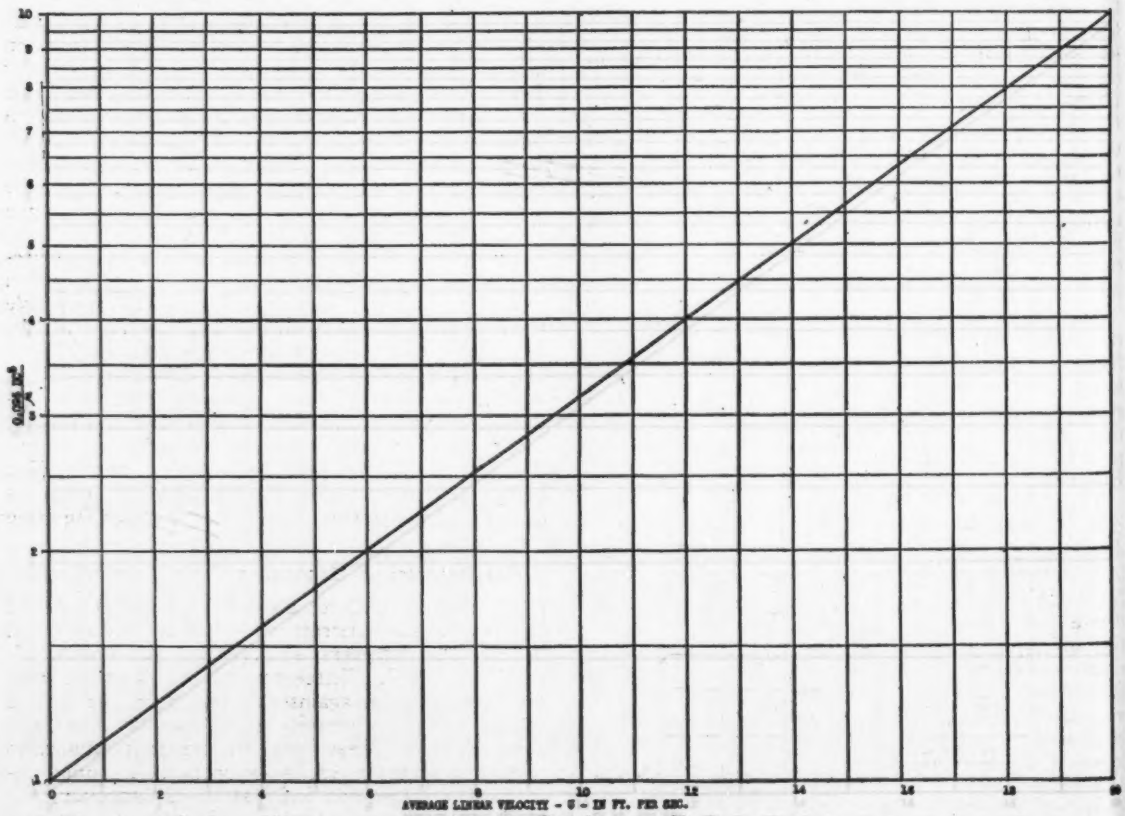


FIG. 4
Semi-Log Plot of Equation — Log $\frac{0.095DC^3}{\mu}$ = 0.05 U

TABLE I.—HEAD LOSS RESULTS USING A CALCULATED APPARENT VISCOSITY

| Pipe Size, inches | Consistency, % | U, f.p.s. | $\mu$, lb. / ft. sec. | Reynolds number | $\Delta H_{calc.}$, ft. | $\Delta H_{act.}$, ft. |
|---|---|---|---|---|---|---|
| 6 | 5 | 2.22 | 4.67 | 15.0 | 65.3 | 47.0 |
| 6 | 5 | 4.45 | 3.61 | 38.9 | 100 | 78.0 |
| 6 | 4 | 2.22 | 2.40 | 29.1 | 33.6 | 26.2 |
| 6 | 4 | 4.45 | 1.85 | 75.8 | 51.7 | 45.7 |
| 6 | 4 | 6.67 | 1.43 | 147 | 60.0 | 60.8 |
| 6 | 4 | 8.90 | 1.11 | 253 | 62.0 | 69.4 |
| 6 | 4 | 11.1 | 0.860 | 407 | 59.8 | 67.8 |
| 6 | 4 | 13.3 | 0.670 | 627 | 55.8 | 54.3 |
| 6 | 4 | 15.6 | 0.513 | 958 | 50.2 | 45.6 |
| 6 | 3.50 | 2.22 | 1.60 | 43.7 | 22.3 | 17.7 |
| 6 | 3.50 | 6.67 | 0.958 | 219 | 40.2 | 41.8 |
| 6 | 3.50 | 8.90 | 0.743 | 377 | 41.5 | 45.9 |
| 6 | 3.50 | 13.3 | 0.447 | 937 | 37.3 | 34.6 |
| 6 | 2.50 | 2.22 | 0.585 | 120 | 8.15 | 8.60 |
| 6 | 2.50 | 6.67 | 0.350 | 601 | 14.7 | 13.0 |
| 6 | 2.50 | 11.1 | 0.210 | 1670 | 14.6 | 8.50 |
| 8 | 5 | 1.28 | 6.87 | 7.73 | 31.8 | 37.9 |
| 8 | 5 | 3.84 | 5.11 | 31.2 | 70.8 | 63.6 |
| 8 | 3.75 | 2.57 | 2.49 | 42.8 | 23.2 | 24.0 |
| 8 | 3.75 | 7.72 | 1.38 | 232 | 38.6 | 42.9 |
| 8 | 3.75 | 14.1 | 0.662 | 885 | 33.7 | 39.0 |
| 8 | 2.50 | 3.84 | 0.640 | 249 | 8.89 | 11.9 |
| 8 | 2.50 | 7.72 | 0.410 | 780 | 11.5 | 13.0 |
| 8 | 2.50 | 11.6 | 0.262 | 1840 | 11.0 | 10.3 |
| 10 | 5 | 0.812 | 9.07 | 4.65 | 17.0 | 15.3 |
| 10 | 5 | 3.25 | 6.85 | 24.7 | 51.2 | 47.5 |
| 10 | 5 | 5.68 | 5.18 | 57 | 68.0 | 68.0 |
| 10 | 4 | 2.44 | 3.86 | 32.9 | 21.7 | 21.0 |
| 10 | 4 | 5.68 | 2.66 | 111 | 34.9 | 34.0 |
| 10 | 4 | 9.75 | 1.66 | 306 | 37.3 | 39.8 |
| 10 | 3 | 2.44 | 1.83 | 69.4 | 10.3 | 10.5 |
| 10 | 3 | 5.68 | 1.26 | 235 | 16.5 | 13.5 |
| 10 | 3 | 9.75 | 0.787 | 645 | 17.7 | 14.0 |
| 12 | 6 | 0.567 | 19.25 | 1.84 | 17.5 | 36.0 |
| 12 | 6 | 1.70 | 16.9 | 6.27 | 46.0 | 64.5 |
| 12 | 4.75 | 1.70 | 8.37 | 12.7 | 22.7 | 29.0 |
| 12 | 4.75 | 3.97 | 6.44 | 38.5 | 40.8 | 46.5 |
| 12 | 4.75 | 6.81 | 4.65 | 91.3 | 50.7 | 52.3 |
| 12 | 4 | 1.70 | 5.02 | 21.2 | 13.6 | 18.0 |
| 12 | 4 | 3.97 | 3.86 | 64.2 | 24.6 | 26.3 |
| 12 | 4 | 6.81 | 2.79 | 152 | 30.5 | 28.8 |
| 12 | 3 | 1.70 | 2.39 | 44.3 | 6.5 | 8.0 |
| 12 | 3 | 3.97 | 1.84 | 135 | 11.7 | 10.8 |
| 12 | 3 | 6.81 | 1.35 | 319 | 14.5 | 11.2 |

the higher consistencies in a small pipe at low velocities one would be inclined to suspect true plug flow. Over the entire range of all the other data viscous flow was indicated by the apparent Reynold's numbers calculated. Only in the case of the second exception were the apparent Reynold's numbers above 2100 and this case is then explained on the basis of fully developed turbulence. It may be that over the range of the other consistencies some turbulence exists, but its effect is apparently nullified or smoothed out by the presence of the solid fibers, and it does not become fully developed until very high rates of flow are reached. When high rates of flow are encountered the head loss curves are approaching the water curve as an asymptote.

The equation for apparent viscosity has been checked by recalculating the original head loss curves. Some of these results are given in Table I. All head losses check within the usual limits of experimental accuracy—plus or minus 15%. The viscosity equation obtained expresses results in terms of rather old pipe having a roughness factor of about 1.6 or a Hazen-Williams coefficient of 100.

The original head loss data, upon which the viscosity equation is based, had been adjusted using direct ratios of Hazen-Williams coefficients obtained by a water flow calibration of the pipe lines used *(3)*. Since the calculated apparent Reynold's numbers indicate that viscous flow obtained over the major portion of the original data, it may be that this adjustment would not have been necessary. It is an established fact that pipe roughness has little effect in viscous flow *(7, 8)*. If the adjustment were not necessary it would result in slightly higher head losses in the 6-inch pipe and lower losses in the 10- and 12-inch pipe. This would then affect the viscosity values directly and would probably result in the elimination of the diameter term in Equations 2 and 3. It would not affect, however, the rest of the equation or the method employed in deriving the equation. The use of Equation 3 is only permissible in the viscous range for calculated Reynold's numbers of 2100 or less. When the viscosity gives a Reynold's number above 2100 it would be permissible to consider the suspension to be pure water and still obtain results which would be within the allowable limits of error.

## Comparison with Other Methods

A critical analysis of the two previous methods *(2, 9)* for determining apparent viscosity by use of a viscometer-pipe flow correlation will show that they either have distince disadvantages or else do not apply to all suspensions. The method of Wilhelm, Wroughton, and Loeffel *(9)* is the more general of the two and theoretically should apply. However, by using the present correlation for water data and calculating the apparent viscosity no viscometer measurements would be needed.

The method of Caldwell and Babbitt *(2)* depended for its correlation in the viscous range on a particular type of head loss *versus* velocity curve which was essentially flat with a constant upward slope over a reasonable range of velocities. It so happens that the suspensions used, clay slurry and sewage sludges, gave such head loss *versus* velocity curves. Paper stock suspensions give curves which are more parabolic in shape and consequently do not lend themselves to this treatment *(3)*.

The method of calculated apparent viscosities is free from such disturbing factors and should give reproducible results in every case.


## Acknowledgment

The author wishes to express his appreciation for the timely criticisms and encouragement offered by J. G. L. Caulfield and L. C. Jenness by whom the method of approach to the problem of suspension flow was suggested.

Acknowledgment and thanks are due the Penobscot Chemical Fibre Company for their assistance in supplying the necessary stock for experimental work and to Hollingsworth and Whitney Company for their generous gift of a centrifugal pump.


## APPENDIX

### A. Calculation of apparent viscosity from head loss

$\Delta H$ = 39.8 ft. (for sulphite stock, 4% consistency, in 10-inch pipe at 2400 g.p.m.)
$D$ = 0.834 ft.
$U$ = 9.75 ft. per sec.
$L$ = 100 ft.
$\rho$ = 62.3 lb. per cu. ft. (taken equal to that of water)
$g$ = 32.2 ft. per sec. per sec.

$$f = \frac{\Delta H D g}{2LU^2} = \frac{(39.8)\ (0.834)\ (32.2)}{(2)\ (100)\ (95.5)} = 0.056$$

Apparent Reynold's number = 280 [From *(8)* p. 811]

$$\text{Apparent viscosity} = \frac{DU\rho}{Re} = \frac{(0.834)\ (9.75)\ (62.3)}{280} = 1.81 \frac{\text{lb.}}{\text{ft. sec.}}$$

### B. Calculation of head loss from apparent viscosity

(Desired head loss to be for 3.5% consistency sulphite stock in 6-inch pipe at 600 g.p.m.)

$D$ = 0.505 ft.
$U$ = 6.67 ft. per sec.
$L$ = 100 ft.
$\rho$ = 62.3 lb. per cu. ft.
$g$ = 32.2 ft. per sec. per sec.

$$\frac{0.095\ D\Delta^2}{\mu} = 2.17 \text{ (from Fig. 4 at U. = 6.67)}$$

$$\mu = \frac{0.095\ D\Delta^2}{2.17} = \frac{(0.095)\ (0.505)\ (42.9)}{(2.17)} = 0.950 \frac{\text{lb.}}{\text{ft. sec.}}$$

$$Re = \frac{DU\rho}{\mu} = \frac{(0.505)\ (6.67)\ (62.3)}{(0.950)} = 221$$

$$f = \frac{\Delta H D g}{2LU^2} = 0.072 \text{ [from } (8) \text{ p. 811]}$$

$$\Delta H = \frac{2LU^2\ (0.072)}{D\ g} = \frac{(2)\ (100)\ (44.5)\ (0.072)}{(0.505)\ (32.2)} = 39.4 \text{ ft.}$$

Actual observed head loss = 41.8 ft.

### Nomenclature

$C$ Moisture-free consistency, %
$D$ Internal pipe diameter, feet
$f$ Fanning friction factor, dimensionless
$g$ Acceleration due to gravity, feet per second$^2$
$\Delta H$ Head loss due to friction, feet of fluid flowing, (Taken as feet of water as applied to pulp suspensions)
$L$ Length of straight pipe, feet
$\rho$ Density of fluid, pounds per cubic feet (taken as 62.3 for pulp suspensions)
Re Reynold's number $= \frac{DU\rho}{\mu}$, dimensionless
$\mu$ Viscosity, pounds per foot second
$U$ Average linear velocity, feet per second

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## TAPPI Notes

The annual meeting of the Technical Association of the Pulp and Paper Industry will be held at the Commodore Hotel, New York, N. Y., on February 15-18, 1943. Individuals wishing to present papers should notify R. G. Macdonald, 122 East 42nd street, New York, by December 1.

John H. Heuer, formerly of Berst-Forster-Dixfield Company, is now an aviation cadet, Squadron 111, Flight B, San Antonio, Texas.

The Technical Section of the Papermakers Association of Great Britain has available for sale a copy of R. H. Clapperton's de luxe, limited edition, book on "Paper: An Historical Account of Its Making by Hand from the Earliest Times." It is printed on hand made paper. The price is £12. Anyone interested should write to R. G. Macdonald. The proceeds of the sale will be used to purchase books for British prisoners of war in Germany.

The TAPPI Kalamazoo Valley Section will meet at the Park American Hotel, Kalamazoo, Mich., on December 2, 1942. B. H. Little of the Hercules Powder Company will discuss "Resins from Rosin and Terpenes and Their Application in the Paper Industry.

*Correction:* T 605 m, sheet 2, reverse side, end of second column. The formula should read:

Total moisture as received $=$

$$\frac{100 - (\%\text{ air drying loss})}{100} \times (\%\text{ moisture in air dried sample passing No. 20 sieve}) + (\%\text{ air drying loss})$$

## Ireland Pressed for Paper Materials

WASHINGTON, D. C., November 16, 1942—Ireland is attempting to release large stocks of old paper and books said to be held in residences and business premises. The Eire Minister for Supplies has made an order increasing the prices payable for the waste, says an unofficial report received by the government here. The order applies to prices paid by paper mills to wastepaper merchants. Prices paid by the latter for supplies remain as they were.

Newspapers and magazines in Eire continue to be pressed for paper supplies, but some publications are using paper made from Irish grown wheat straw.

## New Books of Interest

The McGraw-Hill Book Company has recently published the following books of timely interest:

CHEMISTRY OF ENGINEERING INTEREST by Robert B. Leighou, late Professor of Chemistry, Carnegie Institute of Technology. (629 pp. 6 x 9.) This book features the uses of a number of engineering materials such as water fuels, lubricants, refractories, metals and alloys, coatings, building stones, lime and gypsum products, cement, clays, abrasives, glass, organic plastics, rubber, glues and adhesives and insulating materials. The present volume is the fourth edition, the first being published 25 years ago and revised three times. (Price $4.50.)

HEAT TRANSMISSION by W. H. McAdams, Massachusetts Institute of Technology. (2nd ed., 459 pp. 6 x 9, 198 illustrations.) (Price $4.50.) A book primarily for chemical and mechanical engineers and sponsored by the Committee on Heat Transmission of the National Research Council. Greater progress has been made in this field in the last 10 years than in any previous decade and the vast amount of information buried in the literature is brought together in a single compact volume. The contents of this book is divided into three parts—conduction, convection and radiation. A large number of illustrative examples appear.

HOW TO SUPERVISE PEOPLE by Alfred M. Cooper, consultant. (150 pages, 5 x 7¼.) (Price $1.75.) This book explains how foremen and executives may analyze their jobs and apply correct methods to handling specific problems met in their daily work such as hiring, firing, reprimanding, getting cooperation, delegating authority, training workers, etc. The author is especially noted for his ability to handle conferences. This art is carefully explained.

THE TECHNIQUE OF EXECUTIVE CONTROL by E. H. Schell, Massachusetts Institute of Technology. (5th ed., 251 pp. 5½ x 8.) (Price $2.00.) An analysis of the problems that confront an executive in his relations with his subordinates, associates and superiors. Nearly every factor which is likely to affect getting the work done is discussed. A chapter dealing with the executive's part in the national emergency is included.

These books may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y.

## Found Fellowship at Mellon Institute

Hawley Products Company, St. Charles, Ill., manufacturer of molded cellulosis and allied plastic products, has founded an Industrial Fellowship in Mellon Institute, Pittsburgh, for the purpose of conducting an investigational program of importance to our armed forces.

Dr. J. C. Williams, an alumnus of Oberlin and Iowa State College, a specialist in cellulose chemistry and plastic technology, has been appointed to the incumbency of this Fellowship. He will be assisted by Peter Shanta, a chemical engineer from the University of Pittsburgh, and will have the constant cooperative aid of experts in the Institute and in the donor's organization.

# IMPORTS OF PAPER

## NEW YORK IMPORTS

WEEK ENDING NOVEMBER 14, 1942

SUMMARY

Newsprint .....2,296 rolls

NEWSPRINT

N. Y. Evening Journal, ——, ——, 546 rolls.
Karr Ellis Co., ——, ——, 414 rolls.
Wessel Duval & Co., ——, ——, 624 rolls.
Evening Buletin, ——, ——, 712 rolls.

WOODPULP

——, ——, ——, 400 bls. unbleached sulphite.

## Newsprint Production Decreases

Production of newsprint in Canada during October 1942 amounted to 271,555 tons and shipments to 295,625 tons according to the News Print Service Bureau. Production in the United States was 84,217 tons and shipments 85,458 tons, making a total United States and Canadian news print production of 355,772 tons and shipments of 381,083 tons. During October, 21,822 tons of news print were made in Newfoundland, so that the North American production for the month amounted to 377,594 tons. Total production in October 1941 was 435,611 tons.

The Canadian mills produced 142,970 tons less in the first ten months of 1942 than in the first ten months of 1941, which was a decrease of five and one tenth percent. The output in the United States was 47,715 tons or five and six tenths percent less than in the first ten months of 1941, in Newfoundland production was 55,090 tons or eighteen and eight tenths percent less, making a total decrease of 245,775 tons, or six and two tenths percent less than in the first ten months of 1941.

Stocks of news print paper at the end of October were 95,265 tons at Canadian mills and 11,310 tons at United States mills, making a combined total of 106,575 tons compared with 131,886 tons on September 30, 1942, and 174,196 tons at the end of October 1941.

## Creditors of Quebec Co. Meet

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., November 16, 1942 — Maurice Belanger, Quebec lawyer, has been appointed assignee, and five other men were appointed inspectors at a meeting of creditors of the Quebec Pulp and Paper Corporation of Chicoutimi, Que., declared bankrupt following court action taken by the Quebec Department of Lands and Forests to recover $1,824,710 owed by the company. The firm has been inactive since 1930.

The inspectors follow: Raymond Latreille, engineer-in-chief of the hydraulic service of the Department of Lands and Forests; J. E. Guay, forestry engineer of the department; Emile Morin, Deputy Minister of Municipal Affairs; Rene Morin, manager of General Trust of Canada, representing preferred shareholders; John G. Porteous, Quebec lawyer representing other shareholders.

Jean Paul Galipeault of Quebec is representing the government with John Ahearn, of Montreal, as adviser.

## Charles B. Hays Honored

KALAMAZOO, Mich., November 15, 1942—A group numbering 150, friends and business associates of Charles B. Hays, prominently identified with the paper industry and a leading realtor in Kalamazoo, gathered in the ball room at the Burdick Hotel, on Friday evening, November 13, for a dinner in commemoration of his eightieth birthday which occurred November 15. The event was sponsored by the Kalamazoo Real Estate Board and during the evening a plaque was presented to Mr. Hays by that body, in honor of the occasion.

A native of Kalamazoo, Mr. Hays was prominently identified with the organization of the Bryant, King, Monarch, and the Michigan Paper Company's coating plants in Kalamazoo. In 1910 he headed a group of associates who purchased the old Syms and Dudley mill in Watervliet, Mich., from the American Writing Company, and organized the Watervliet Paper Company which has been one of the prosperous book mills in this valley for many years.

Mr. Hays served as president of the corporation for a decade and at present is vice president and one of the major stockholders. He served with credit as mayor of his native city in 1912. He plotted and developed practically all of the desirable home building sections in Kalamazoo and during his career in that line of endeavor personally built over 1500 homes.

His hobby for years has been golf, his Arcadia course which he laid out and still operates being the most pleasing one in Michigan. As a member of the Senior Golfers Association he was one of three cited by Grantland Rice as turning in the most remarkable performances in 1942. Many friends of Mr. Hays present at the dinner, were called upon by Toastmaster Lewis C. Wright, and they responded with their endorsements of his contributions to the community as a citizen and blending in many humorous incidents.

## OBITUARY

*(Continued from page 13)*

manager for the International Purchasing Company, Boston, for 12 years during which time he was also associated with the Rope Paper Sack Association.

He lived in Newtonville, Mass. He attended the Worcester Polytechnic Institute, and was a member of the Plymouth Masonic Lodge, and the Legion of Valor. A captain in the 30th Infantry, 3rd Division, in the last war, he was awarded the Distinguished Service Cross.

He leaves his widow, the former Jennie Dale; four children Emery, Jr., Jane, Robert and Anabel, and his mother, Mrs. F. L. St. George of Plymouth.

### W. F. Reuter

William Frederick Reuter, who, until his retirement in 1920, had been associated for thirty years with Louis Dejonge & Co., New York paper manufacturers, died today at his home at St. James, L. I., of a heart ailment at the age of 70.

He leaves a widow, Mrs. Jean Reuter.

## Joins Chemical Warfare Service

Captain Paul L. Barnes, formerly associated with Arno W. Nickerson, chemical engineer and consultant in paper making and converting, 542 5th avenue, New York, is now with the Chemical Warfare Service, 292 Madison avenue, New York.

# New York Paper and Pulp Market Review

## Demand For Paper Continues Active as Curtailment in Output Looms—Demand For Chemical Wood Pulp is Currently Decreasing—Old Waste Paper Market Slow—Roofing Rags Are Active.

Office of the PAPER TRADE JOURNAL.
Wednesday, November 18, 1942.

Demand for many grades of paper is reported active with doubt reflected in most reports that the demand can be met. Present government plans are expected to reduce the over-all production of paper and paper products drastically. If the war continues through next year, opinion in some quarters is expecting production to decrease to approximately 50% of capacity.

The index of general business activity for the week ended November 7, declined to 121.2%, from 133.1% for the preceding week, compared with 129.7% for the corresponding week last year. Paper board production was 3.4% higher.

Paper production for the week ended November 7 was estimated at 89.9%, compared with 105.0% for 1941, with 97.8% for 1940, with 98.1% for 1939, and with 80.9% for the corresponding week for 1938.

Paper board production for the week ended November 7 was 84.0%, compared with 97.0% for 1941, with 78.0% for 1940, with 84.0% for 1939, and with 80.0% for the corresponding week for 1938.

The index of manufacturers' shipments of paper for September, 1942, according to the Department of Commerce, rose to 135 from 131 for August (average months 1939—100). The total of all industries for September, 1924, was 224, and for August 212; compared with 185 for September and 168 for August, 1941.

The index value of manufacturers' inventories of paper for September (average month 1939—100) was 154.7, and 154.6 for August; compared with 125.4 for September, and 124.2 for August, 1941. The total of all industries for September was 175.3, and 175.0 for August, 1942; compared with 143.4 for September, and 140.0 for August, 1941.

Commenting on the change applicable to all business, the Department of Commerce says in part that, business inventories were reduced during the third quarter of 1942, as the nation began drawing upon the stockpile of materials accumulated over the past three years. A net decline of more than $300 million in the combined holdings of manufacturers, wholesalers, and retailers marked the first time since 1939 that inventories have been lower at the end of a quarter than at its beginning. The decline this year is in striking contrast to the rise of $1.6 billion during the comparable quarter of 1941, a period of rapidly increasing momentum for the huge inventory expansion of that year.

Reports this week indicate that the program for the curtailment of some grades of paper has, in some mills, resulted in a decling of 40% to 35%, from the output of last year.

The Office of Price Administration issued on November 12 a directive order, covering cutting manufacturers' prices of toilet tissue and paper towels from levels of March, 1942, to those prevailing in October, 1941. The regulation sets the maximum percentage markeup for paper merchants based on the size of an order as follows: 1 to 2 cases, 45%; 3 to 9 cases, 27½%; 10 to 24 cases, 25%; 25 to 99 cases, 22½%; 100 to less than carlots, 17½%; carlots, 5%.

### Wood Pulp

Demand for all grades of chemical wood pulp is reported as less active, and a further decrease in the trend of mill buying is expected to continue. The impending WPB curtailment program in the production of paper is attributed to be the cause. Naturally, reports state, no mill is likely to increase its inventories of pulp in the future, in view of the prospect of a substantial curtailment of paper.

### Rags

Demand for cotton cuttings is rather light at this date. The trade is expecting an OPA price schedule on cuttings before long, and there is some hesitation in pushing sales because of the increasing costs that must be absorbed at current quotations.

A meeting of the cotton cutting trade and the OPA is expected to discuss the price question next week.

Mill buying of roofing rags is reported active and ceiling prices are firmly maintained.

### Old Rope and Bagging

Old rope prices are firmly maintained on most grades. Mill buying of old No. 1 Manila rope continues to absorb about all available supplies.

Trading in scrap bagging is quiet. Mill buying is at about the lowest level in months.

### Old Waste Paper

The paper stock market is slow at this date. Collections are still reported as rather light, but current demand is insufficient to more than make prices moderately firm. Prospects for the near future are not very bright, in view of the paper board curtailment plan expected to be established on an over-all basis before long.

### Twine

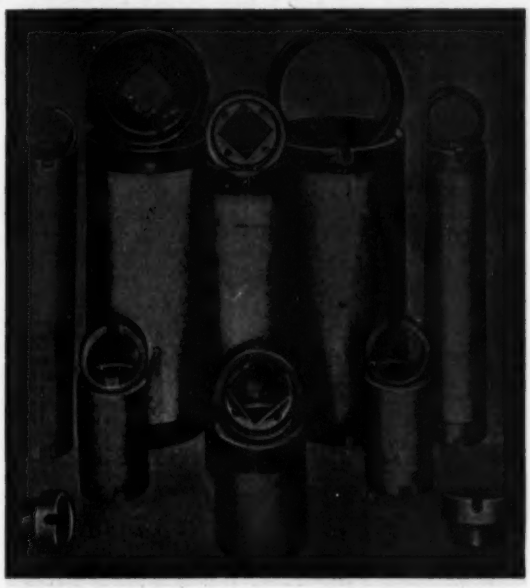
Government purchasing of twine continues heavy. Trade demand is good for the season. Prices are firm and unchanged on standard grades of hard and soft fiber twines.

## More Storrs & Bement Men in Service

BOSTON, Mass., November 16, 1942.—Additional men from the Storrs & Bement Company who are in the service include Philip Schultz in the Navy, and Kenneth Shaw and Peter Flaherty in the Army. Mr. Flaherty has been shipper for the company approximately 15 years.

## To Have Horse and Wagon Delivery

BOSTON, Mass., November 16, 1942.—Storrs & Bement Company, a prominent firm of paper merchants at 282 Congress street, following the trend of the times, is to have a horse and wagon for city deliveries, in the effort to give the customer service.



# ELIXMAN

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Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

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**CORINTH, N. Y.**

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OF FELT CARE.....
To help you get more wear from your felts and thereby save wool, Orr presents this check list for your help and information.
1) Do you check suction box covers for splinters and abrasives and dress them frequently?
2) Do you examine rolls, boxes, and journals for surface grease and remove at once if found, before attempting to place felt on machine?
3) Have you recently checked felt rolls for balance? For free turning?
4) Is your felt cleaner, particularly those parts touching the felt, in excellent condition?
5) Are you sure that your felt stretchers are operating freely?
6) Do you know if the crowning of your press rolls is correct? Are these rolls in alignment?
7) Are you sure your whipper arms are operating evenly and with correct amount of whip?
8) Are holes in shower pipes open and applying correct spray?
9) Do you check water temperature and insist that correct temperature be maintained?
10) Have you checked for presence of iron hydroxide in the water, the chemical that makes felts stiff and boardy?
11) Are deckles on board machines smooth and free from rough edges?
12) Have Orr Sales Engineers told you the latest method of cleaning, drying, and storing felts?
Orr Felt representatives are eager to help you. Call for them when reordering felts or when needing assistance.
ORR FELTS
THE ORR FELT & BLANKET CO.
PIQUA, OHIO

## MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, November 18, 1942.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. The pulp is currently quoted at $40 per ton in barrels, at works; the powder is offered at $60 per ton, f.o.b., works. Demand reported fair for the week.

BLEACHING POWDER—Prices on bleaching powder are firm. Current demand reported heavy. Bleaching powder is currently quoted at $2.25 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are little changed for the week. Standard domestic casein, 20-30 mesh, is quoted at 19 cents per pound; 80-100 mesh at 19½ cents per pound; all prices in bags, car lots. Argentine casein, 20-30 mesh, at 7½ cents per pound, c.i.f., is reported nominal. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are reported unchanged. Supplies ample. Demand moderate for the current week. Solid caustic soda is currently quoted at $2.30 per 100 pounds, flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Demand reported fair for the current week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Government demand for war use continues heavy. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosins are lower for the current week. "G" gum rosin is currently quoted at $3.48 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.46 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $3.68 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand reported light for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. Quotations on imported salt cake are nominal at $16 per ton.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand moderate. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch continue unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported light. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices of sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mills. No quotations on imported talc.

## MARKET QUOTATIONS

**All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.**

### Paper

(Delivered New York)

| | | | |
|---|---|---|---|
| News, per ton— | | | |
| Roll, contract | $50.00 | @ | — |
| Sheets | 55.00 | | — |
| Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill | | | |
| Superstandard Wrapping | $5.00 | @ | — |
| No. 1 Wrapping | 4.75 | " | — |
| Standard Wrapping | 4.50 | " | — |
| Standard Bag | 4.125 | " | — |
| Tissues—Per Ream—Carlots | | | |
| White No. 1 | 1.12½ | " | — |
| White No. 1 M. G. | 1.05 | " | — |
| White No. 1½ | 1.00 | " | — |
| White No. 2 | 1.00 | " | — |
| Anti-Tarnish M. G. | .95 | " | — |
| Colored | — | " | — |
| Kraft | .95 | " | — |
| Manila | .90 | " | — |
| Unbl. Toilet, 1 M. | 4.16 | " | — |
| Bleached Toilet | 5.70 | " | — |
| Paper Towels, Per Case— | | | |
| Unbleached, Jr. | 2.35 | " | — |
| Bleached, Jr. | 2.65 | " | — |
| Manila—per cwt.—C. l. f. n. | | | |
| No. 1 Jute | 11.35 | @ | — |
| No. 1 Manila Wrapping, 35 lb. | 3.50 | " | 3.75 |
| No. 2 Manila Wrapping, 35 lb. | 3.25 | " | 3.50 |
| Boards, per ton— | | | |
| News | *48.00 | @ | — |
| Chip | *45.00 | " | — |
| Spl. Mla. Ll. Chip | *60.00 | " | — |
| White Pat. Coated | *75.00 | " | — |
| Kraft Liners 50 lb. | *60.00 | " | — |
| Binders Boards | 84.00 | " | 116.00 |

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

| | Bonds | | Ledgers |
|---|---|---|---|
| 100% Rag | | | |
| No. 1 | $40.25@$47.35 | $41.40@$48.50 | |
| 100% Rag | 32.20 " 37.75 | 33.35 " 39.25 | |
| 85% Rag | .... " .... | 32.20 " 37.75 | |
| 75% Rag | 29.75 " 29.00 | 25.90 " 30.50 | |
| 65% Rag | .... " .... | 22.80 " 27.75 | |
| 50% Rag | 18.70 " 21.75 | 19.90 " 24.25 | |
| 25% Rag | 16.40 " 20.00 | 17.95 " 21.50 | |

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

| | Bonds | | Ledgers |
|---|---|---|---|
| No. 1 | $10.50@$13.75 | $11.70@$14.25 | |
| No. 2 | 9.35 " 11.75 | 10.50 " 13.25 | |
| No. 3 | 9.35 " 11.75 | 10.50 " 13.25 | |
| No. 4 | 8.50 " 10.75 | 10.50 " 13.25 | |

Colors $1.00 cwt. extra.

Fine Sheet Book Papers—White, Coated Paper.

Delivered in Zone 1.

| | | |
|---|---|---|
| No. 1 Glossy Coated | $12.45 | @$13.50 |
| No. 2 Glossy Coated | 12.40 | " 14.00 |
| No. 3 Glossy Coated | 11.60 | " 13.25 |
| No. 4 Glossy Coated | 11.15 | " 12.75 |
| No. 1 Antique (water marked) | 10.25 | " 11.75 |
| No. 2 Offset | 9.60 | " 11.50 |
| A Grade E. F. | 9.35 | " 10.75 |
| A Grade S. & S. C. | 9.60 | " 11.00 |
| B Grade E. F. | 8.85 | " 10.25 |
| B Grade S. & S. C. | 9.10 | " 10.50 |
| C Grade E. F. | 8.35 | " 9.75 |
| C Grade S. & S. C. | 8.60 | " 10.00 |
| D Grade E. F. | 8.25 | " 9.50 |
| D Grade S. & S. C. | 8.50 | " 9.75 |

Ivory & India at $.50 cwt. extra.

### Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight to Destination.

| | | |
|---|---|---|
| Bl. Softwood Sulphite | $76.00 | |
| Unbl. Softwood Sulphite | 64.00 | @ 66.00 |
| Bl. Hardwood Sulphite | 73.00 | |
| Unbl. Hardwood Sulphite | 63.00 | |
| Bl. Mitscherlich | 81.00 | |
| Unbl. Mitscherlich | 72.00 | |
| N. Bleached Sulphate | 86.00 | |
| S. Bleached Sulphate | 79.00 | |
| N. Semi-Bleached Sulphate | 82.00 | |
| S. Semi-Bleached Sulphate | 75.00 | |
| N. Unbl. Sulphate | 73.00 | |
| S. Unbl. Sulphate | 63.50 | |
| Bl. Soda | 66.00 | |
| Unbl. Soda | 62.00 | |
| Groundwood | 46.00 | |

Transportation Allowances Applying to Producers of Wet Wood Pulp.

| | Below 50% Air Dry Weight |
|---|---|
| Northeast | $13.50 |
| Lake Central | 13.50 |
| Southern | 14.00 |
| West Coast (in area) | 10.50 |
| West Coast (out area) | 16.50 |

| | 50%-80% Air Dry Weight |
|---|---|
| Northeast | $11.50 |
| Lake Central | 11.50 |
| Southern | 14.00 |
| West Coast (in area) | 9.50 |
| West Coast (out area) | 13.50 |

Applying to Producers of Dry Wood Pulp.

| | Above 80% Air Dry Weight |
|---|---|
| Northeast | $1.50 |
| Lake Central | 1.50 |
| Southern | 1.00 |
| West Coast (in area) | 2.50 |
| West Coast (out area) | 11.50 |

Should freight charges actually exceed these allowances, the difference may be added to the maximum price.

### Domestic Rags

New Rags (Prices to Mill f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New Whites, No. 1 | 6.00 | @ | 6.25 |
| Blacks, No. 1 | 4.50 | " | 4.75 |
| New Unbleached | 4.00 | " | 4.25 |
| New Overall | 1.75 | " | 1.90 |
| Fancy | 1.00 | " | 1.25 |
| Washables | 2.50 | " | 2.75 |
| Mixed Khaki Cuttings | 1.50 | " | 1.75 |
| O. D. Khaki Cuttings | 1.00 | " | 1.15 |

# Is Slimeform* in action

# PLUGGING YOUR FELTS?

Plugged felts are often the cause of time-consuming slowdowns in production schedules. What's more, frequent replacement of these felts today is a difficult and expensive proposition. That's why it's well to remember that they can be avoided, effectively and inexpensively, by maintaining close microbiological control of process water. For plugged felts as well as obstructed lines, blinded wires, breaks, wash-up interruptions, spots, stains or pin holes, are frequently caused by slime-forming micro-organisms.

During these busy days Wallace & Tiernan water treatment methods can aid tremendously. Scientifically applied, a small amount of chlorine in the entering and circulating water will act quickly and effectively in eliminating microbiological growths. With the experience of more than 300 paper mills to guide them, W&T specialists will have no trouble putting their finger on your particular problem. Get in touch with Wallace & Tiernan today. P-37

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**UNIFORM • SUPERIOR • DEPENDABLE**

**English China Clays Sales Corporation**
**551 Fifth Avenue, New York City**

### Old Rags

| | | | |
|---|---|---|---|
| White, No. 1— | | | |
| Repacked | *3.80 | " | — |
| Miscellaneous | *3.20 | " | — |
| White, No. 2— | | | |
| Repacked | *2.90 | " | — |
| Miscellaneous | *2.65 | " | — |
| Third and Blues— | | | |
| Repacked | *2.20 | " | — |
| Miscellaneous | *1.80 | " | — |
| Roofing Rags— | | | |
| No. 1 | *1.55 | " | — |
| No. 2 | *1.45 | " | — |
| No. 3 (bagging) | *1.35 | " | — |
| No. 4 | *1.35 | " | — |
| No. 5A | *1.35 | " | |
| Old Manila Rope | 5.75 | " | — |

OPA Maximum Prices.

### Foreign Rags

All prices nominal

New Rags

| | | | |
|---|---|---|---|
| New Dark Cuttings | 2.25 | @ | 2.40 |
| New Mixed Cuttings | 2.00 | " | 2.20 |
| New Light Silesias | 5.50 | " | 5.75 |
| Light Flannelettes | 5.50 | " | 5.75 |
| New White Cuttings | 7.00 | " | 7.50 |
| New Light Oxfords | 4.00 | " | 4.50 |
| New Light Prints | 3.00 | " | 3.25 |

Old Rags

| | | | |
|---|---|---|---|
| No. 1 White Linens | 7.50 | " | 8.50 |
| No. 2 White Linens | 6.50 | " | 7.50 |
| No. 3 White Linens | 4.50 | " | — |
| No. 4 White Linens | 2.25 | " | 3.25 |
| No. 1 White Cotton | 4.25 | " | 4.75 |
| No. 2 White Cotton | 3.25 | " | 3.75 |
| No. 3 White Cotton | 2.50 | " | 3.00 |
| No. 4 White Cotton | 1.90 | " | 2.20 |
| Extra Light Prints | 2.00 | " | 2.40 |
| Ord. Light Prints | 1.75 | " | 2.15 |
| Med. Light Prints | 1.55 | " | 1.95 |
| Dutch Blue Cottons | 2.25 | " | 2.50 |
| French Blue Linens | 3.00 | " | — |
| Checks and Blues | 2.00 | " | — |
| Linsey Garments | 1.90 | " | 2.00 |
| Dark Cottons | 1.50 | " | 1.60 |
| Old Shopperies | 1.30 | " | 1.45 |
| New Shopperies | 1.45 | " | 1.50 |
| French Blues | 2.25 | " | 2.50 |

### BAGGING

(Prices to Mill, f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign | Nominal | | |
| Domestic | 4.00 | @ | 4.25 |
| Wool Tares, light | 4.25 | " | 4.50 |
| Wool Tares heavy | 4.50 | " | 4.75 |
| Bright Bagging | 4.50 | " | 4.85 |
| Manila Rope— | | | |
| Foreign | — | " | — |
| Domestic | *5.75 | " | — |
| Jute Threads | 4.25 | " | 4.75 |
| Sisal Strings | 3.25 | " | 3.75 |
| Mixed Strings | 1.10 | " | 1.20 |

* OPA Maximum Price.

### Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

| | | | |
|---|---|---|---|
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | @ | — |
| No. 1 Hard White Envelope Cuts | 3.12½ | " | — |
| No. 1 Hard White Shavings, unruled | 2.87½ | " | — |
| No. 1 Hard White Shavings, ruled | 2.50 | " | — |
| Soft White Shavings, one cut | 2.87½ | " | — |
| No. 1 Soft White Shavings | 2.50 | " | — |
| Soft White Shavings, Misc. | 2.15 | " | — |
| No. 1 Fly Leaf Shavings | 1.67½ | " | — |
| No. 2 Fly Leaf Shavings | 1.12½ | " | — |
| No. 1 Groundwood Fly Leaf Shavings | 1.25 | " | — |
| No. 2 Mixed Groundwood Fly Leaf Shavings | .90 | " | — |
| Mixed Colored Shavings | .75 | " | — |
| Mixed Groundwood Colored Shavings | .90 | " | — |
| Overissue Magazines | 1.67½ | " | — |
| No. 1 Heavy Books & Magazines | 1.57 | " | — |
| Mixed Books | 1.07½ | " | — |
| No. 1 White Ledger | 2.17½ | " | — |
| No. 2 Mixed Ledger, colored | 1.87½ | " | — |
| New Manila Envelope Cuttings, one cut | 2.87½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| Extra Manilas | 1.85 | " | — |
| Mixed Kraft, Env. & Bag Cuttings | 2.75 | " | — |
| Kraft Envelope Cuttings | 3.25 | " | — |
| Triple Sorted, No. 1 Brown Soft Kraft | 2.50 | " | — |
| New 100% Kraft Corrugated Cuttings | 2.25 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| New Jute Corrugated Cuttings | 1.75 | " | — |
| Old Corrugated Containers | 1.00 | " | — |
| Box Board Cuttings | .72½ | " | — |
| White Blank News | 1.65 | " | — |
| Overissue News | .85 | " | — |
| No. 1 News | .75 | " | — |
| No. 1 Mixed Paper | .70 | " | — |

### Twines

(F. o. b. Mill)

(Soft Fiber)

| | | | |
|---|---|---|---|
| Coarse Polished— | | | |
| India | .21 | @ | — |
| White Hemp | .21 | " | — |
| Fine Polished— | | | |
| Fine India | .26 | " | — |
| Unpolished— | | | |
| Box | .17¾ | " | — |
| Paper Makers | .17 | " | — |
| Tube Rope | .19 | " | — |
| Wall Paper | .20½ | " | — |
| Wrapping | .23 | " | — |
| Soft Fiber Rope | .19 | " | — |
| Cotton | .25 | " | — |

(Hard Fiber)

| | | | |
|---|---|---|---|
| Medium Java | .18 | " | — |
| Mex. Sisal | .16 | " | — |
| Manila | — | " | — |

## PHILADELPHIA

### Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New White No. 1 | .07¼ | @ | .07½ |
| New White No. 2 | .04½ | " | .05 |
| Light Silesias | .04½ | " | .04¾ |
| Silesias, No. 1 | .04 | " | .04¼ |
| Black Silesias, soft | .03¾ | " | .04 |
| New Unbleached | .07¼ | " | .07½ |
| Washable Prints | .03¾ | " | .03½ |
| Washable No. 1 | .02 | " | .02¼ |
| Blue Overall | .04½ | " | .05½ |
| Cottons—According to grades— | | | |
| Washable shredding | — | " | .01¾ |
| Fancy Percales | .03¼ | " | .03½ |
| New Black Soft | .02¾ | " | .03 |
| New Dark Seconds | 1.75 | " | 2.00 |
| Khaki Cuttings— | | | |
| No. 1 O. D. | .03 | " | .03¼ |
| No. 2 Mixed | .02¼ | " | .02½ |
| Corduroy | .01¾ | " | .02¼ |
| New Canvas | .04¾ | " | .05¾ |
| New Black Mixed | — | " | .02½ |

### Domestic Rags (Old)

| | | | |
|---|---|---|---|
| White No. 1—Repacked | 3.80 | " | — |
| White No. 2—Repacked | 2.90 | " | — |
| Miscellaneous No. 1 | 3.20 | " | — |
| Miscellaneous No. 2 | 2.65 | " | — |
| Thirds and Blues— | | | |
| Miscellaneous | 1.80 | " | — |
| Repacked | 2.20 | " | — |
| Black Stockings— | | | |
| (Export) | Nominal | | |
| Roofing Stock— | | | |
| Foreign No. 1 | Nominal | | |
| Domestic No. 1 | 1.55 | " | — |
| Domestic No. 2 | 1.45 | " | — |
| Roofing Bagging | 1.35 | " | — |
| Old Manila Rope | 5.75 | " | — |

### Bagging

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign | Nominal | | |
| Domestic | 3.00 | " | 3.50 |
| Sisal Rope | 3.75 | " | — |
| Mixed Rope | .75 | " | 1.00 |
| Scrap— | | | |
| No. 1 | 3.25 | " | 3.50 |
| No. 2 | 1.75 | " | 1.90 |
| Wool Tares, heavy | 4.00 | " | 4.25 |
| No. 1 New Light Burlap | 3.00 | " | 4.00 |
| New Burlap Cuttings | 3.75 | " | 4.00 |

### Old Papers

(F. o. b. Phila.)

OPA Maximum Prices

| | | | |
|---|---|---|---|
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | " | — |
| No. 1 Hard White Shavings, unruled | 2.50 | " | — |
| Soft White Shavings, one cut | 2.87½ | " | — |
| White Blank News | 1.65 | " | — |
| Soft White Shavings, Misc. | 2.15 | " | — |
| No. 1 White Ledger | 2.17½ | " | — |
| No. 2 Ledger, colored | 1.87½ | " | — |
| No. 1 Heavy Books & Magazines | 1.57 | " | — |
| Overissue Magazines | 1.67½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| No. 1 Mixed Paper | .70 | " | — |
| Box Board Cuttings | .72½ | " | — |
| Jute Corrugated Cuttings | .90 | " | — |
| Overissue News | .85 | " | — |
| No. 1 News | 1.00 | " | — |

## BOSTON

### Old Papers

(F. o. b. Boston)

OPA Maximum Prices

| | | | |
|---|---|---|---|
| No. 1 Hard White Shavings, unruled | 2.87½ | @ | — |
| No. 1 Hard White Shavings, ruled | 2.50 | " | — |
| Soft White Shavings, Misc. | 2.15 | " | — |
| No. 1 Fly Leaf Shavings | 1.67½ | " | — |
| No. 2 Fly Leaf Shavings | 1.12½ | " | — |
| No. 1 Groundwood Fly Leaf Shavings | 1.25 | " | — |
| No. 2 Groundwood Fly Leaf Shavings | .90 | " | — |
| Mixed Colored Shavings | .75 | " | — |
| New Manila Envelope Cuts, one cut | 2.87½ | " | — |
| Hard White Envelope Cuts, one cut | 3.37½ | " | — |
| Triple Sorted No. 1 Brown Soft Kraft | 2.50 | " | — |
| Mixed Kraft Env. & Bag Cuttings | 2.75 | " | — |
| Kraft Envelope Cuttings | 3.25 | " | — |
| No. 1 Heavy Books & Magazines | 1.57 | " | — |
| New Manila Envelope Cuts, one cut | 2.87½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| White Blank News | 1.65 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| No. 1 Mixed Paper | .70 | " | — |
| Overissue News | .85 | " | — |
| Box Board Cuttings | .72½ | " | — |
| New Corrugated Cuttings, Kraft | 2.25 | " | — |
| Old Corrugated Containers | 1.00 | " | — |
| Jute Corrugated Cuttings | 1.07½ | " | — |

### Bagging

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Gunny Bagging— | | | |
| Foreign | (nominal) | | |
| Domestic | 3.50 | @ | 4.00 |
| Sisal Rope | 4.50 | " | 4.75 |
| Mixed Rope | 1.35 | " | 1.50 |
| Transmission Rope— | | | |
| Foreign | (nominal) | | |
| Domestic | 3.00 | " | 3.50 |
| Manila Rope— | | | |
| Foreign | (nominal) | | |
| Domestic | 5.75 | " | — |
| Soft Jute Rope | 4.75 | " | 5.25 |
| Jute Carpet Threads | 3.25 | " | 3.50 |
| Bleachery Burlap | 8.50 | " | 9.00 |
| Scrap Burlap— | | | |
| Foreign | (nominal) | | |
| Domestic | 3.50 | " | 3.75 |
| Scrap Sisal | 4.50 | " | 4.75 |
| Scrap Sisal for Shredding | — | " | .04¾ |
| Wool Tares— | | | |
| Foreign | (nominal) | | |
| Domestic | 5.00 | " | 5.75 |
| Aust. Wool Pouches | 5.10 | " | 5.25 |
| New Burlap Cuttings | 5.00 | " | 5.25 |
| Heavy Baling Bagging | 4.25 | " | 4.75 |
| Paper Mill Bagging | 2.75 | " | 3.00 |
| No. 2 Bagging | 1.35 | " | |

* OPA Maximum Price

### Domestic Rags (New

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New Light Prints | .04½ | @ | .04¾ |
| Fancy Percales | .04¼ | " | .05 |
| New White No. 1 | .06¼ | " | .06½ |
| New Light Flannelettes | .05½ | " | .06 |
| Canton Flannels, Bleached | .06 | " | .06½ |
| Underwear Cutters, Bleached | .06 | " | .06½ |
| Underwear Cutters, Unbleached | .05¾ | " | .06 |
| Silesias No. 1 | .06 | " | .06½ |
| New Black Silesias | .03 | " | .03½ |
| Red Cotton Cuttings | .03½ | " | .04 |
| Soft Unbleached | .06½ | " | .06¾ |
| Blue Cheviots | .05½ | " | .06 |
| Fancy | .02¾ | " | — |
| Washable | .02¾ | " | — |
| Khaki Cuttings | .02¾ | " | .03 |
| O. D. Khaki | .03½ | " | .03¾ |
| Corduroy | .03¼ | " | .03¾ |
| New Canvas | .06¼ | " | .06¾ |
| B. V. D. Cuttings | .06¼ | " | .06¾ |

### Domestic Rags (Old)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| White No. 1— | | | |
| Repacked | 3.80 | @ | —* |
| Miscellaneous | 3.20 | " | —* |
| White No. 2— | | | |
| Miscellaneous | 2.65 | " | —* |
| Twos and Blues, Repacked | 2.20 | " | —* |
| Old Blue Overalls | 2.25 | " | 2.30 |
| Thirds and Blues, Repacked | 2.20 | " | —* |
| Miscellaneous | 1.80 | " | —* |
| Black Stockings | 3.50 | " | 4.00 |
| Roofing Stock— | | | |
| No. 1 | 1.55 | " | —* |
| No. 2 | 1.45 | " | —* |
| No. 3 | 1.35 | " | —* |
| No. 4 | 1.35 | " | —* |
| No. 5, Quality A | 1.35 | " | —* |
| Quality B | 1.20 | " | —* |
| Quality C | .95 | " | —* |
| Old Manila Rope | 5.75 | " | — |

* OPA Maximum Prices.

### Foreign Rags

(F. o. b. Boston)

| | |
|---|---|
| Canvas | (nominal) |
| Dark Cottons | (nominal) |
| Dutch Blues | (nominal) |
| New Checks and Blues | (nominal) |
| Old Fustians | (nominal) |
| Old Linsey Garments | (nominal) |
| New Silesias | (nominal) |

## CHICAGO

### Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | " | — |
| No. 1 Hard White Shavings, unruled | 2.50 | " | — |
| No. 1 Soft White Shavings | 2.50 | " | — |
| No. 1 White Ledger | 2.17½ | " | — |
| No. 1 Heavy Books & Magazines | 1.57 | " | — |
| White Blank News | 1.65 | " | — |
| Mixed Kraft Env. & Bag Cuttings | 2.75 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| Overissue News | .85 | " | — |
| No. 1 News | .75 | " | — |
| No. 1 Mixed Paper | .70 | " | — |
| No. 1 Roofing Rags | 1.55 | " | — |
| No. 1 Roofing Bags | 1.45 | " | — |